JULY 20, 1953

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

What To Plate

Bright work with less nickel keeps gleam on metal products — p. 84

✓ **MACHINE TOOL POSSIBILITY**
$1.2 Billion Volume in 1953, p. 43

✓ **TITANIC TITANIUM**
Aircraft Firms Want 565% More, p. 47

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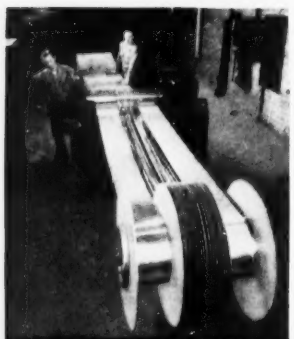
IMMEDIATE DELIVERY

of aluminum coils and sheet

from KORHUMEL aluminum headquarters

. . . Get the quantity, size and type you need from the largest, most complete stock available.

Save valuable time and money, eliminate costly delays, meet production schedules on the dot . . . with aluminum coils and sheet from Korhumel Aluminum Headquarters. Whatever quantity, size, type, temper or alloy you need, get immediate delivery from the most complete stocks available. Extra-wide coils in gauges from .010 up through the heaviest. For your convenience, Korhumel stocks a complete selection of aluminum rods and bars as well. Make Korhumel your aluminum headquarters. For delivery tomorrow, call your Korhumel Sales Engineer today.



TAKE PROFITABLE ADVANTAGE of Korhumel's complete slitting and shearing facilities. Coils of all sizes slit and straight lengths sheared to your most exacting specifications.

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Simplify your ordering. Write or call for your free copy of up-to-the-minute Korhumel Aluminum Stock list.

STEEL
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- Spring Steel, Tempered and Annealed
- Feeler Gauge
- Round Edge Flat Wire
- Shim Steel
- Electro Galvanized
- Electrical Sheets
- Tin Plate
- Cold Finished Bars
- Tubing, Seamless, Welded
- Rigidtex Stainless
- Hydraulic Tubing

ALUMINUM
- Strip and Sheet
- Coils
- Straight Lengths
- Bars

PHOSPHOR BRONZE
- Coils and Flats

SERVICES
- Slitting
- Shearing
- Edge Rolling
- Bright Annealing
- Cold Rolling
- Ungerer Roller Leveling

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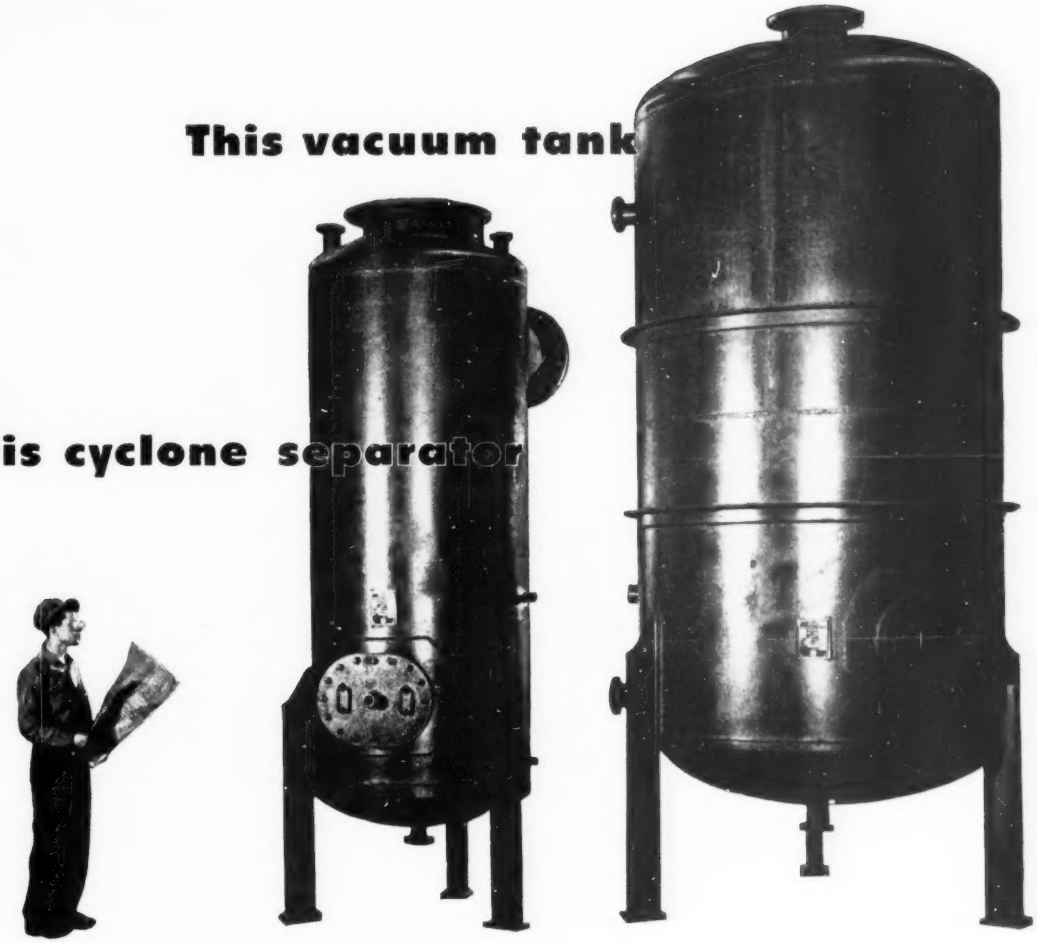
Chicago Phone: AMbassador 2-6700 • Evanston Phone: DAvis 8-3000

This vacuum tank

This cyclone separator



BOTH MADE BY WELDING

The vessel at left in the photograph is called a cyclone separator. It is 48 in. in diameter, and about 13 ft high. Its shell thickness is ⅜ in., its weight 5706 lb.

Its big brother, at the right, is a vacuum condensate tank, 72 in. in diameter, 14 ft, 10 in. high, ⅜ in. in shell thickness, and weighing 6452 lb. Both vessels are for use in a desulphurizing unit for a manufacturing plant, and were turned out in our Weldments Shop.

You may never have occasion to use anything as formidable-sounding as a cyclone separator, or a vacuum condensate tank. But if you build any kind of mechanical equipment, we strongly suggest that you look into the worthwhile advantages of Bethlehem Weldments.

Here's What You Get with Bethlehem Weldments

ECONOMY. There's no excess weight with Bethlehem Weldments, nor any sacrifice of rigidity. And of course weight-reduction often makes possible a lower manufacturing cost.

VERSATILITY. With Bethlehem Weldments there's no limit to the sizes or types of shapes that can be welded. These weldments can be used effectively as simple parts, or as sections of intricate assemblies.

FREEDOM OF DESIGN. You have absolute freedom of design with Bethlehem Weldments, because the steel can be bent, pressed or shaped prior to welding, without affecting its physical structure.

FREEDOM OF USE. Bethlehem Weldments can be used alone. Or they may be combined with forgings, castings, or both.

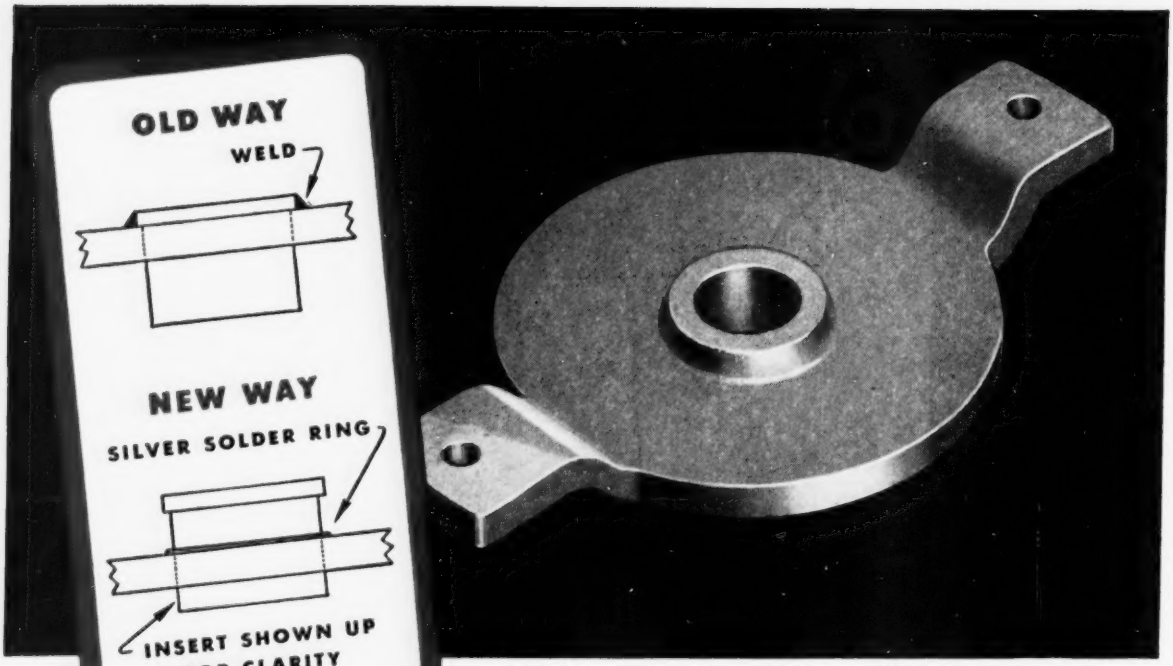
If you would like to discuss with a Bethlehem representative the advantages to be derived through the use of weldments, please write or phone the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM WELDMENTS

BETHLEHEM STEEL



Assembly Cost *Cut 32%* with TOCCO* Induction Brazing

Now's the time to balance YOUR production budget

This assembly may bear no resemblance to your product, but its case is typical of the savings accomplished by Induction Heating of metal parts of all sizes and shapes.

Formerly the Norris Thermador Corporation used arc welding to join the bushing and clamp shown above. In an effort to reduce costs TOCCO Induction Heating was brought into the production picture with the following results:

OLD METHOD (Arc Welding)		**NEW METHOD** (TOCCO Induction Brazing)	
Material (rod)	$ 4.56 per M parts	Material (solder and flux)	$13.83 per M parts
Labor	20.63 per M parts	Labor	8.82 per M parts
Overhead	21.25 per M parts	Overhead	9.08 per M parts
Total Cost Old Method	$46.44 per M parts	Total Cost TOCCO Method	$31.73 per M parts

TOCCO Engineers are glad to survey your operations for similar cost-cutting results — no obligation, of course.

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Mail Coupon Today

NEW **FREE** BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-7, Cleveland 1, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering."

Name_____

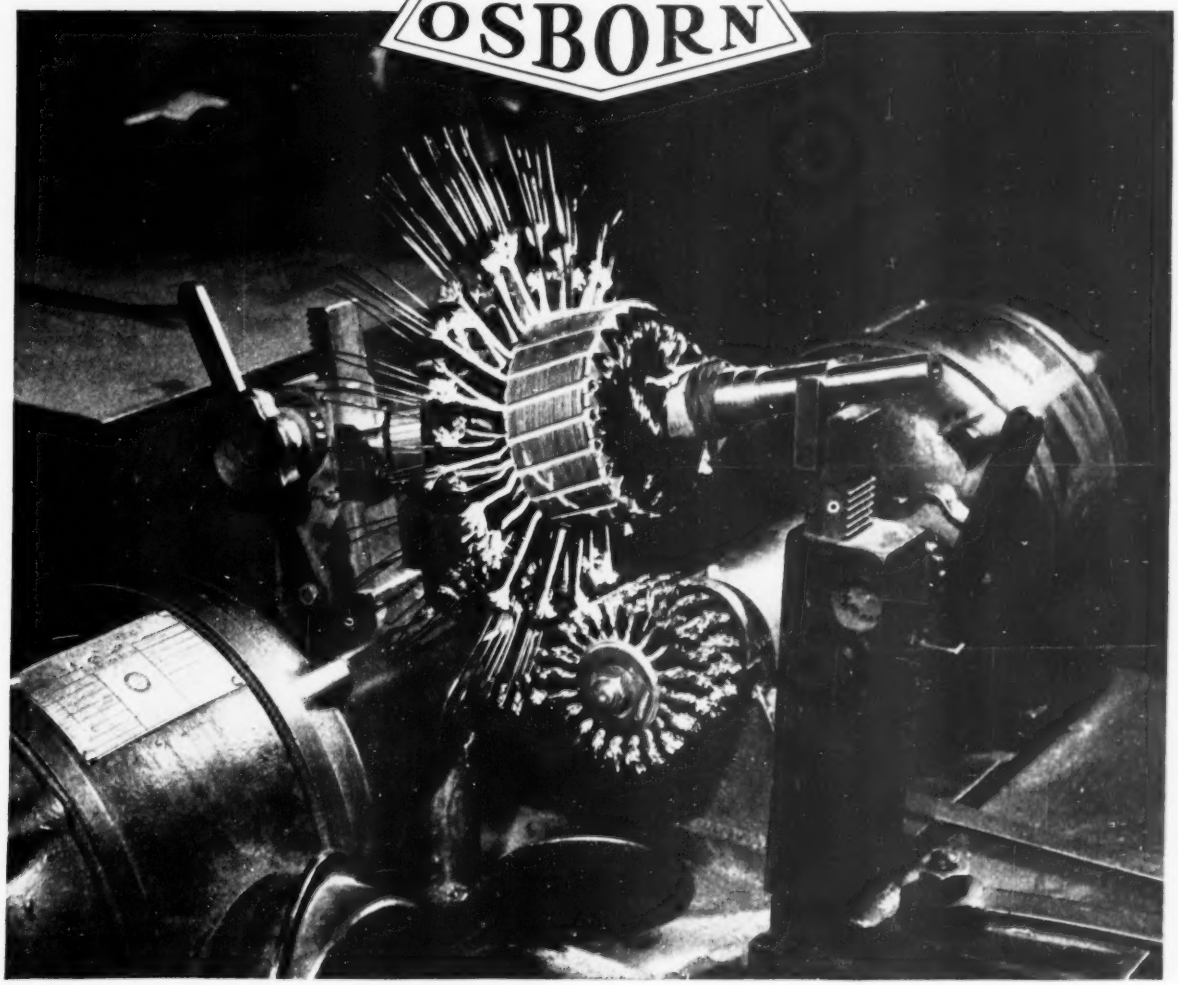
Position_____

Company_____

Address_____

City_____ Zone____ State_____

OSBORN



14 minutes by hand . . .
Now 3 minutes with push-button brushing

This strip act with Osborn wire brushes is taking off costly hours in the production of d-c motor armatures . . . typical of savings being discovered throughout industry with push-button brushing methods.

The job here is to remove enamel insulation from copper wires to assure top quality soldered connections. Formerly done by a tedious hand-scraping method, the time per armature was 14½ minutes. With the motor-driven brushing device shown the time has been cut to 3 minutes. As the armature is turned, a pair of Osborn Disc Center wire brush heads rotate downward on the wires and the insulation comes off clean.

This is typical of thousands of production jobs which have been simplified with the help of the **O**sborn **B**rushing **A**nalyst. For help to improve *your* cleaning, finishing or deburring operations, call your **OBA** or write *The Osborn Manufacturing Company, Dept. G-8, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

FREE: New booklet on deburring with Osborn Power Brushing. Write for your copy.

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

CAPSULES FOR CUPOLAS

Ferrosilicon and ferromanganese briquettes speed up foundry charging operations by eliminating the need for time-consuming weighings. These convenient "capsules" contain exact amounts of either ferrosilicon or ferromanganese. It's easy to get the correct "dose" for the charge.

Ferrosilicon is available in lump, sized or powder form as well. And Tennessee Products also makes low phosphorus pig iron and high grade malleable pig iron for the metal industries.

For complete details, write Tennessee Products & Chemical Corp., First American National Bank Building, Nashville, Tenn.

TENNESSEE
PRODUCTS & CHEMICAL
Corporation
NASHVILLE, TENNESSEE

This Week in Metalworking

STEEL

Vol. 133 No. 3 July 20, 1953

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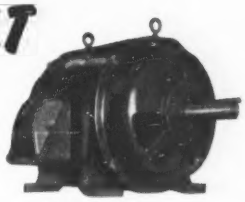
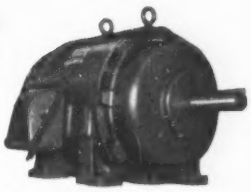
RELIANCE *Precision-Built* MOTORS

BUILT



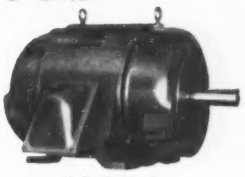
Protected Open

FOR



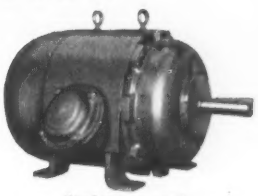
Totally-enclosed, Fan-cooled

RUGGED



Splashproof

SERVICE



Explosion-proof

"All motors are NOT alike!"

● Reliance builds *dependable* motors for all applications. Bulletin B-2101 gives you all the facts. Write for your copy today! B-121

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— Flat
● Round
⧓ Odd contour

Low or high carbon, stainless, special alloy, Armco. You draw the shape—PAGE can draw the wire.

☐ **Armature Banding Wire**

Tinned stainless or carbon steel. In reels of 50 to 200 pounds. Stainless has high tensile strength, high resistance, low permeability.

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Tough, durable, workable. In the size and type for your work.

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*Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

YOU do this—
Give us the specifications of the wire you need—or tell us details of job to be done.

WE'LL do this—
Send you recommendations, prices and delivery date. Samples on request. PAGE offers you a wide variety of wires to choose from.

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ACCO

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AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

behind the scenes

Which Milo Gets the Mail?

Milo A. and Milo E. are sad but the postman's glad. Why? Because after thirteen years of mail mixups at 332 South Michigan Avenue, it seems like everything is under control at last.

Milo A. Smith, general freight agent for the Chicago and Eastern Illinois railroad, has had offices on the seventh floor of the building for years and years.

Milo E. Smith, advertising manager of the Chicago Bridge and Iron Company, has held forth on the 11th floor since the general sales offices of his company were moved there in 1940.

Milo A. first met Milo E. at Christmas time back in '40 when greeting cards intended for one were delivered to the other. Now, after more than 50 years with C. & E. I., Milo A. is retiring. Milo E., a comparative neophyte with only 30 years service with Chicago Bridge to his credit, will continue to answer mail call as usual.

The two Smiths are not related but with an assist from Uncle Sam's postal service, they have become fast friends.

Looks like the postman will ring only once for Milo Smith at 332 South Michigan from now on.

If at First You Don't

We attended a dinner party the other evening at which the guest of honor, a South American visitor, was telling about his country and himself. He concluded his remarks with the statement, "And I have a most charming and sympathetic wife but, alas, no children."

As he looked into the group of question mark expressions surrounding him, he apparently felt further explanation was necessary. He continued haltingly, "You see, my wife is unbearable."

This, too, was greeted with puzzled glances, so he sought to clear the matter up beyond all shadow of doubt: "I mean, my wife is inconceivable."

Seeing that he was still drawing a blank (also controlled convulsions from Shrdlu) he floundered deeper in the intricacies of the English language. Then, when all seemed hopelessly lost, an inspired smile brightened his face and he explained triumphantly: "You see, my friends, my wife, she is impregnable."

Practical Education

We just got our annual summer allotment of college girl typists, stenographers, etc. recently and, if we may be permitted a bit of gauche philosophy, *la viglia di esistenza viene troppo subito* . . . which is just another way of saying "the setting sun is setting, Son."

It's remarkable what these young ladies are being taught at *alma mater uber alles* in this progressive day and age. (We're really not bi-lingual, we just have two heads.)

One young lovely was particularly enthusiastic about the benefits of the physical culture courses she has been taking. She picked up our window-opening pole and said to us, "Just watch this exercise. To develop my arms, I grip the rod by one end and move it slowly from left to right."

It was a beautiful exercise, we must admit. It had grace, rhythm, elegance and the young lass executed it with expert timing and coordination. But do you know, if that rod had had straw at the other end, we'd swear that girl would be sweeping!

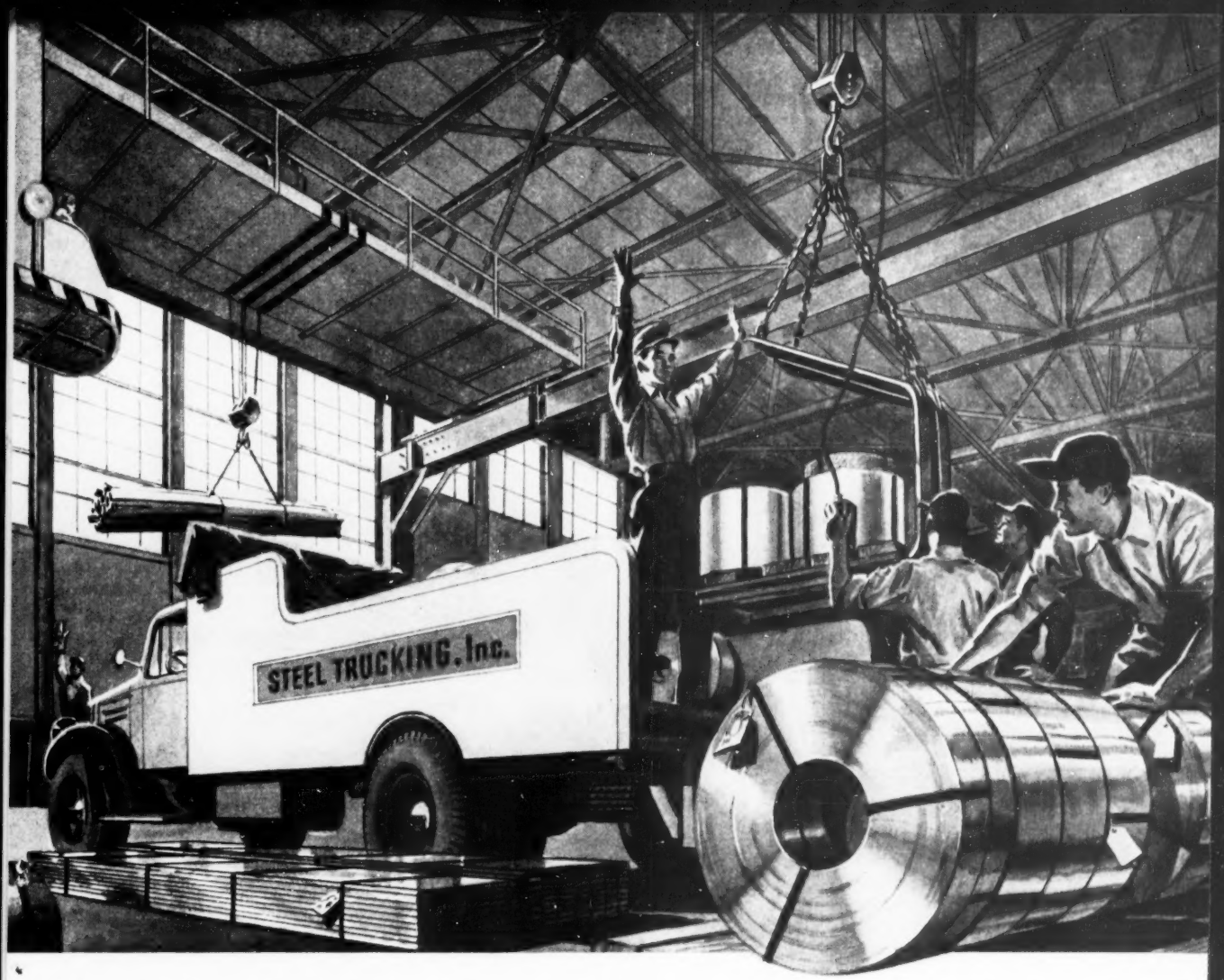
Puzzle Corner

Here's one our eighth grade math teacher never explained to us.

It seems that four men, Peter and Paul and their sons Tom and Dick, buy books. When their purchases are completed it turns out that each man has paid for each of his books a number of dollars equal to the number of books he has bought. Each family (father and son) has spent $65. Peter has brought one book more than Tom and Dick has bought only one book. Who is Dick's father?

Shrdlu

(Metalw rking Outlook—Page 35)



1/24,000,000TH PART OF A GROWING BUSINESS

That's the steel warehouse, where more than 24,000,000 orders for steel are filled each year—orders that call for 14,000,000 tons, about 20 percent of all the steel made in the United States during a year. Their customers number in the neighborhood of half a million, or almost anyone who has a need for steel of any kind.

Sharon has, for more than 40 years, worked with warehouses as a method of distributing steels, in small amounts, into the hands of smaller users.

As an example, Sharon's hot rolled, mill edge, narrow band is extremely popular in the manufacture of toys, furniture, floor grating, etc. Wherever sharp split edges create safety hazards or consumer inconvenience, manufacturers like the smooth mill edge. To get a similar edge from wide stock would require expensive edging operations. Thus, many manufacturers insist on a mill edge. Where the demand is sufficient Sharon supplies these manufacturers directly. But, in the hundreds of cases where smaller users want this same edge advantage, the warehouse can best perform the distribution. What's more, warehousemen know steel, and in the past have been instrumental in introducing fabricators to the advantages of just such hidden features as the mill edge. By filling the void that existed between mill and manufacturer the warehouse has extended a great service to each, and thus has become a definite factor in the world's greatest industry.

SHARONSTEEL

DISTRICT SALES OFFICES

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Cleveland	Dayton
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Philadelphia	Rochester
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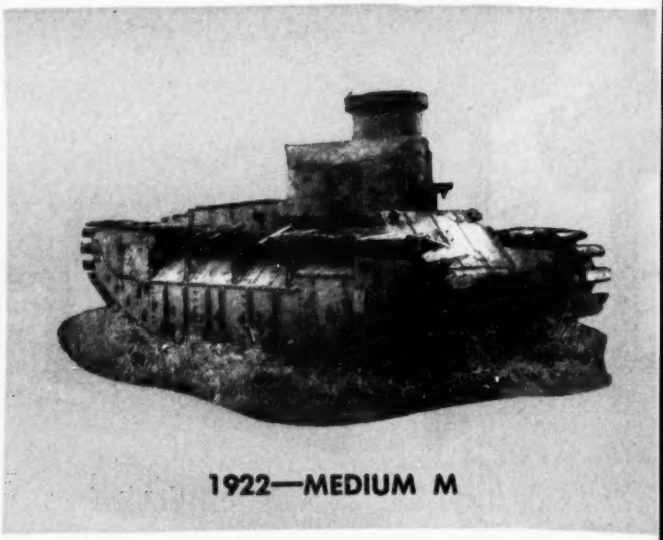
SHARON STEEL CORPORATION

Sharon, Pennsylvania

Throughout the Entire History

1918—MARK VIII



1922—MEDIUM M

1929—LIGHT TANK T-1

1931—CHRISTIE, M

ARMOR PLATE for ORDNANCE

WHAT STANDARD STEEL SPRING COMPANY DOES AND CAN DO FOR YOU...

We have every production facility for armor plate in gauges from ¼" to 4" inclusive. We work with our customers to design the parts properly, to tool for their most economical production, to expedite delivery and to inspect carefully at every phase of manufacture.

Standard Steel Spring Company

# of Tank Development . . .

—STANDARD STEEL SPRING COMPANY HAS PIONEERED MANY DESIGN IMPROVEMENTS IN TANK ARMOR

Serving as key producer and coordinator for Ordnance armor plate programs has been Standard Steel Spring Company's task for many years and again during the current rearmament period. Our talents have lent a guiding hand to the design and production of a multitude of armored components.

Today from a great group of fully staffed and equipped plants we are turning out tank armor in volume. Whatever the needs, we can serve your every requirement—whether it be for large or small parts in flat, blanked or formed shapes, fully machined or even sub-assembled. For armor plate made to exacting specifications, delivered when and where needed, turn to Standard Steel Spring Company first. You'll save time and money by contacting us now.

WORLD WAR II
MEDIUM M-3

WORLD WAR II
60 TON M-6

1952—M-48

ARMOR PLATE DIVISION • PENOBSCOT BLDG. • DETROIT, MICHIGAN

You get UNIFORMITY from start to finish with KEYSTONE "SPECIAL PROCESSED" COLD HEADING WIRE

When you use Keystone "Special Processed" Cold Heading Wire, you get uniform response every step of the way through forming, trimming, threading and final heat treatment.

Uniform, strength-giving grain flow characteristics are clearly indicated in the above macrograph of a high-strength cap screw made from Keystone "Special Processed" C1035 Cold Heading Wire. The long, continuous fibres tell the "inside story" of efficient cold heading which results in longer die life, lower production costs and finished products of the highest quality.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

LETTERS TO THE EDITORS

Stainless Steel Guide Shines

We received a copy of "Guide for Stainless Steel Buyers" with our June 22 issue of STEEL, and want to thank you for this guide. We have had occasion to refer to it during the few days that we have had it, and found it to be valuable and helpful.

R. M. Stock
vice president
Sherron Metallic Corp.
Brooklyn, N. Y.

Our personnel have examined this guide and we all feel that you have done an excellent job in its preparation. This publication should be an excellent reference to buyers in the stainless steel industry.

Ardelle Glaze
president
Fort Wayne Metals Inc.
Fort Wayne, Ind.

You have done an excellent job . . .

John Bigham Jr.
manager of stainless steel sales
Superior Steel Corp.
Carnegie, Pa.

My compliments to you on an outstanding job in compiling this valuable booklet, and it certainly took a lot of hard work, time and patience to produce. Your efforts will be beneficial to the stainless steel industry.

Milton Gallup
chief engineer
G. O. Carlson Inc.
Thorndale, Pa.

As this Guide would be of great value to our purchasing department, we would like to obtain another copy.

J. N. Reinholdt
senior buyer
Material Control Division
PSC Applied Research Ltd.
Toronto, Ont.

"Guide for Stainless Steel Buyers" seems to fill a long felt need.

C. B. Irish
vice president
Leader Iron Works Inc.
Decatur, Ill.

This is an excellent job and well done. We believe that it will be very useful to the buyers in purchasing stainless steel. However, we are a little disappointed in checking the plate section to learn that our limitations are not shown.

Nelson L. Ellis
Eastern Stainless Steel Corp.
Baltimore

• *At its Baltimore plant, Eastern Stainless Steel Corp. produces stainless steel plates in types 301, 302, 304, 305, 321, 347 and 316. Size maximums are $\frac{3}{8}$-inch thickness, 72-inch width, 156-inch length, or 650 pounds.—ED.*

I hear nothing but high praise for this important work. I hope this in

Please turn to page 12

1440

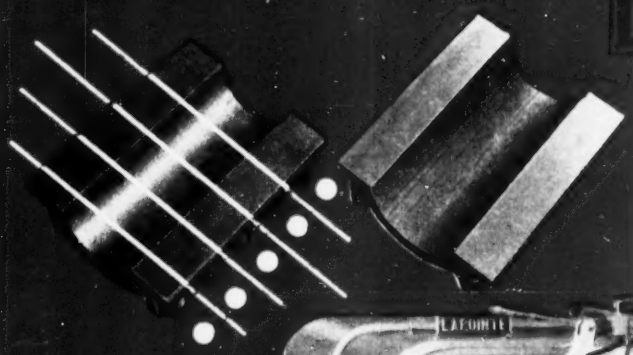
is the production rate in these

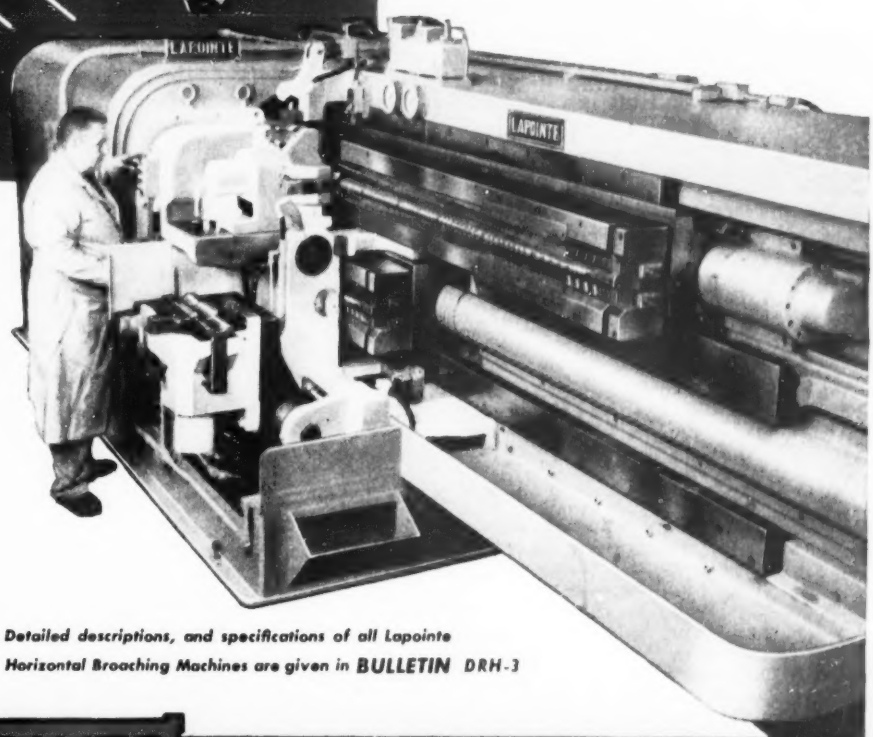
per hour
BROACHING
MAIN BEARING CAPS

This high production is accomplished on the

LAPOINTE

Double Ram Horizontal Broaching Machine, 15-ton size, with 90-inch stroke *. . . using Carbide Broaches.*





Operating at 80 fpm cutting speed, these Main Bearing Caps are broached in clusters of 5, with the half-round, joint faces, and chamfered edges *all broached in one operation!*

SEND FOR FOLDER. *Detailed descriptions, and specifications of all Lapointe Horizontal Broaching Machines are given in* **BULLETIN** *DRH-3*

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HUDSON, MASSACHUSETTS • U. S. A.

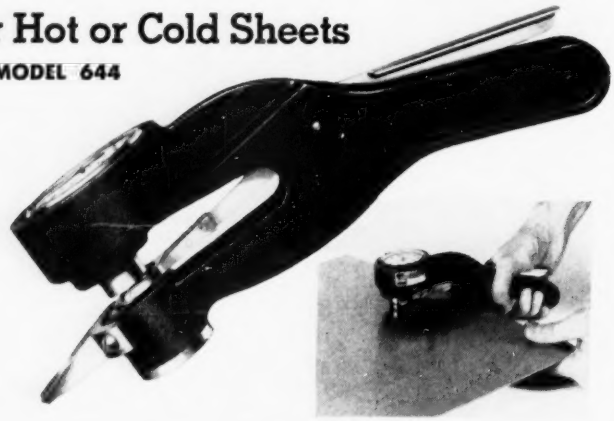
In England: Watford, Hertfordshire

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

Made Especially for Fast Gaging of Sheet Iron and Steel

For Hot or Cold Sheets

MODEL 644

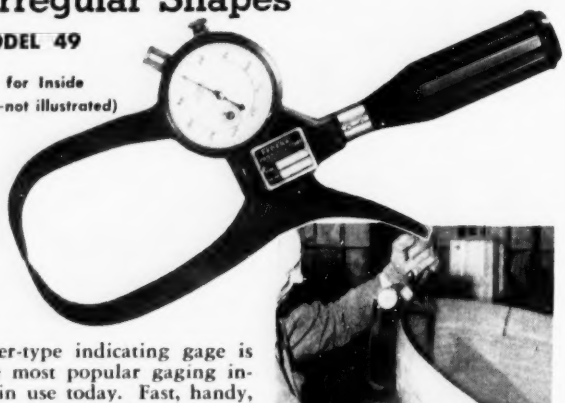


This gage automatically positions itself perpendicular to sheet to assure quick, accurate measurement of sheet and strip stock. Model 644 has many uses besides use on hot sheets such as — gaging material in receiving room to confirm size delivered, checking thickness of material drawn from stock room for manufacturing, and determining thickness of plating by measuring stock before and after plating operation. Furnished with direct or continuous reading dial, depending on use of gage.

For Irregular Shapes

MODEL 49

(Model 149 for Inside Dimensions—not illustrated)



This caliper-type indicating gage is among the most popular gaging instruments in use today. Fast, handy, and convenient, Model 49 checks the outside dimensions or thickness of many articles where the tolerances are not exceedingly close. Patterns, cores, castings, forgings, plastics, dies, glass bottles, sheet material are but a few of hundreds of parts checked by this gage. Two stock models are available but specially shaped jaws and various sizes will be made to suit your needs. Send prints or samples of work for designs and prices.

Tell us your gaging requirements and we will recommend a gage to tell you what you want to know. Federal Products Corp., 1217 Eddy Street, Providence 1, R. I.

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing *all types* of DIMENSIONAL INDICATING GAGES

LETTERS

Concluded from page 10

some small part will reward you and your staff for the countless hours you must have given to its preparation.

William E. McFee
supervisor
Product Information Service
Armco Steel Corp.
Middletown, O.

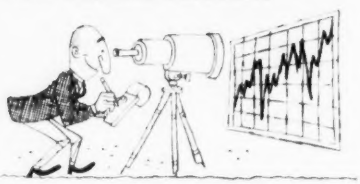
Where's the Wire?

Could you please tell me where 8.5 miles of wire is hidden in the average auto. This statement appeared in the "Mirrors of Motordom" (June 22, p. 59). We frankly find it hard to believe.

R. P. Delaney
1212 Commonwealth Ave.
Boston

• *In arriving at the 8.5 mile figure, engineers regard each strand of wire in its own individual length, thus multiplying the length of a given wire by the number of strands contained within it. From a manufacturing standpoint the concept is perhaps the only usable one since the number of strands within a given type of wire varies immensely from item to item.—ED.*

How Business Forecasts



Have just finished reading your fifth article in a series of management studies entitled "Business Forecasting" (June 29, p. 47). Was very interested in this fine article and if reprints are available would greatly appreciate receiving a copy to be used in conjunction with our marketing program.

Harve R. Watters
market analyst
Schaible Co.
Cincinnati

• *A reprint is being sent.—ED.*

Two Sides to Buying

I have read with great interest your article on purchasing, No. 4 in a Management Series, "Buy Your Way to Lower Costs" (May 25, p. 105).

As a salesman, I found this article very helpful in understanding the problems facing the purchasing men with whom I daily carry on my company's business. Realizing that some of these purchasing people may not see or have an opportunity to read your fine article, I would like very much to obtain 25 reprints.

Robert B. Reed
application engineer
Reliance Electric & Engineering Co.
Detroit

• *Sent.—ED.*

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In this well-known meter plant, as in hundreds of efficient shops, they're jacking up drilling output this simple way: install the easy-handling multiple spindle "Buffalo" Drills your operation requires. You not only eliminate waste setup motions, but you get better accuracy, less worker fatigue and longer drill life.

In the photo above, the men on the four-spindle "Buffalo" No. 22 Drills are able to set up as many as four different drilling, tapping and reaming operations. Production flows right down the line easily and with minimum delays between operations. All controls and adjustment cranks are easily reached, so that these large-capacity machines are as easy to handle as smaller sensitive drills. Let us recommend a drilling arrangement to help cut *your* drilling time and cost!

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"Buffalo"
No. 22
DRILLS

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158 MORTIMER STREET BUFFALO, NEW YORK

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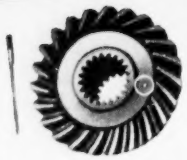
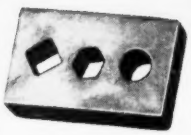
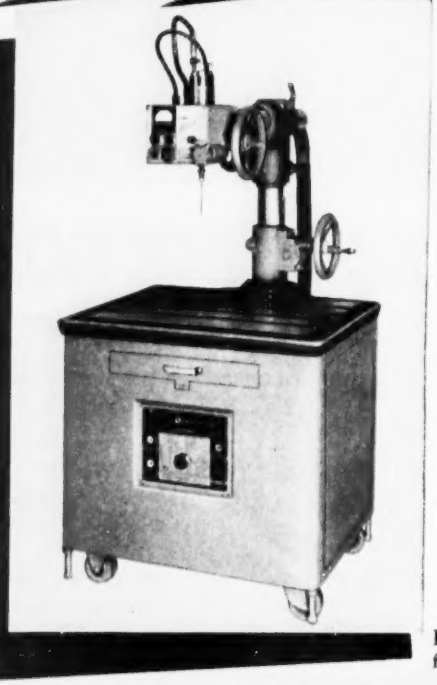


Cut oil holes in hardened gears without annealing

Cut dovetails in hardened dies



Cut any shape hole in cemented carbides



Literally hundreds of thousands of dollars are saved annually by corporations that are using Metalmasters in just tool and die repair alone.

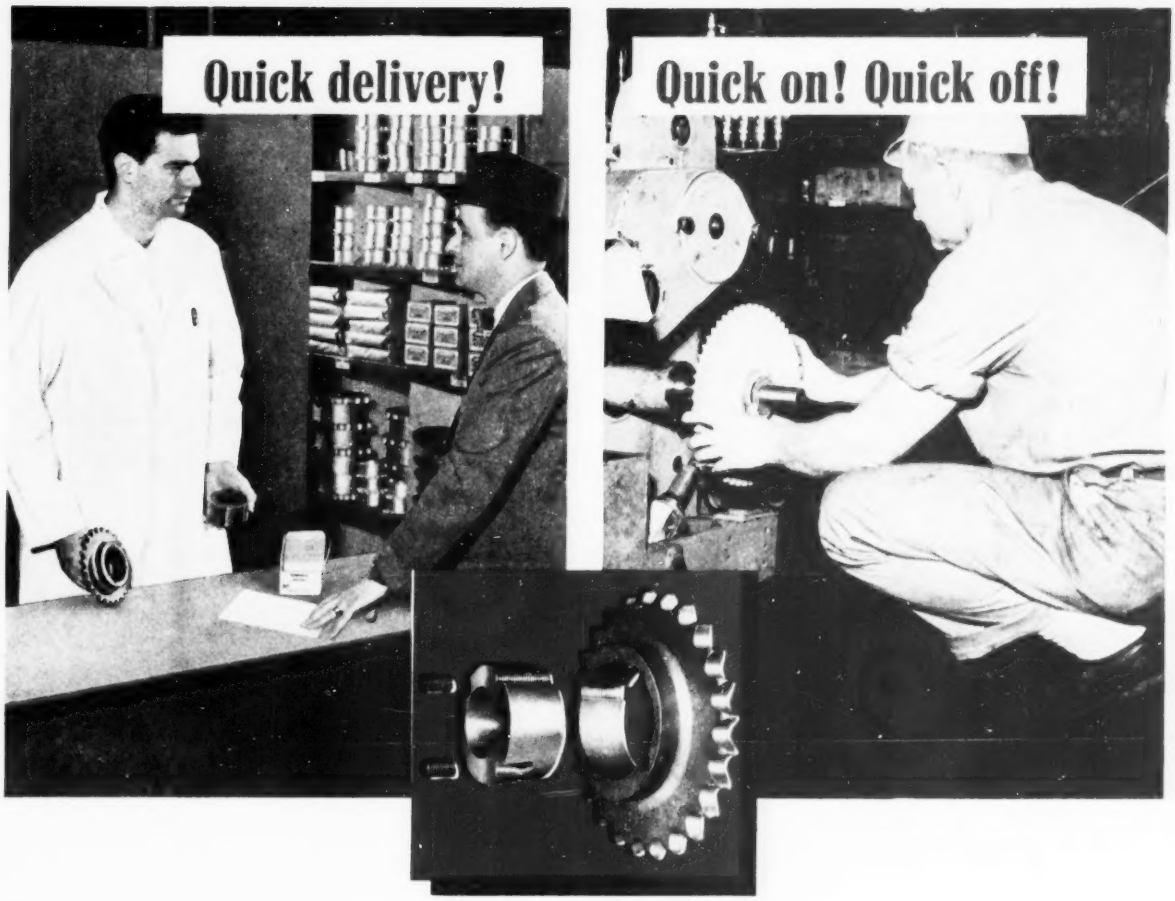
There's a technical engineer in your area to give you an on-the-spot demonstration in your own plant at your convenience. (NOTE: It is not uncommon to pay for a Metalmaster with just one short demonstration thru savings on workpieces.)

For information as to the Metalmasters' uses and benefits merely write today on your company letterhead to:

Metalmaster

DIVISION OF CLINTON MACHINE COMPANY

CLINTON, MICHIGAN

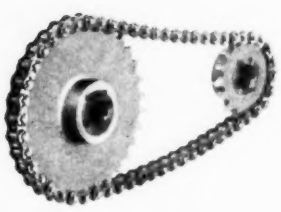


Link-Belt roller chain sprockets with taper lock bushings

HERE'S great news for users of roller chain drives! With the new Link-Belt taper lock sprocket, you don't have to fit the sprocket to the shaft. These sprockets with their taper lock bushings give you the equivalent of a shrink-fit on all standard shaft sizes.

Installation and removal are fast, simple. Set screws force and hold bushing in tapered bore of sprocket, *clamp* it tightly onto shaft. The *full length* of the bushing supports the sprocket on the shaft. Turning set screws in removal holes quickly releases it from shaft.

What's more, it's no longer necessary to wait while wheels are rebored. You can pick these sprockets right off the shelf at your nearby Link-Belt distributor or factory branch store. Available now are sizes for ½, ⅝, ¾, 1 and 1¼-in., single-width chains with other sizes to be announced. Ask for Bulletin 2449.



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LINK-BELT

ROLLER CHAIN AND SPROCKETS

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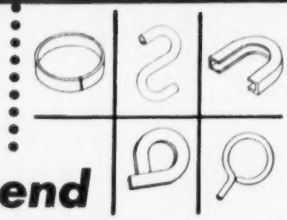

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*Pronounced Die-ack-ro

DI-ACRO HYDRA-POWER BENDER

A universal hydraulically operated bending machine that is equally as flexible as hand operated machine. Di-Acro Hydra-Power Benders are especially designed for those long runs and heavy bending operations which are impractical for manually operated equipment.

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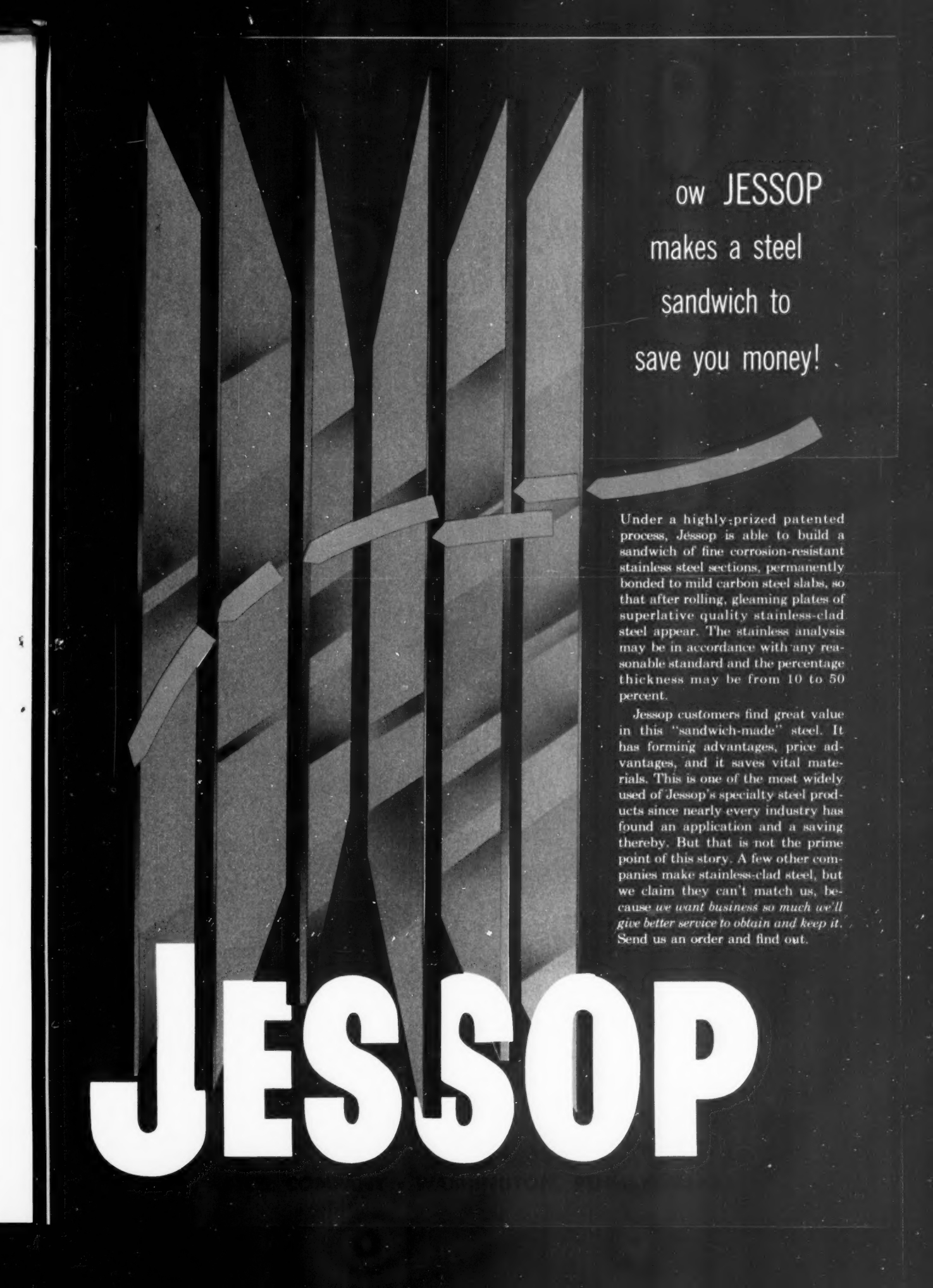

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Under a highly-prized patented process, Jessop is able to build a sandwich of fine corrosion-resistant stainless steel sections, permanently bonded to mild carbon steel slabs, so that after rolling, gleaming plates of superlative quality stainless-clad steel appear. The stainless analysis may be in accordance with any reasonable standard and the percentage thickness may be from 10 to 50 percent.

Jessop customers find great value in this "sandwich-made" steel. It has forming advantages, price advantages, and it saves vital materials. This is one of the most widely used of Jessop's specialty steel products since nearly every industry has found an application and a saving thereby. But that is not the prime point of this story. A few other companies make stainless-clad steel, but we claim they can't match us, because *we want business so much we'll give better service to obtain and keep it.* Send us an order and find out.

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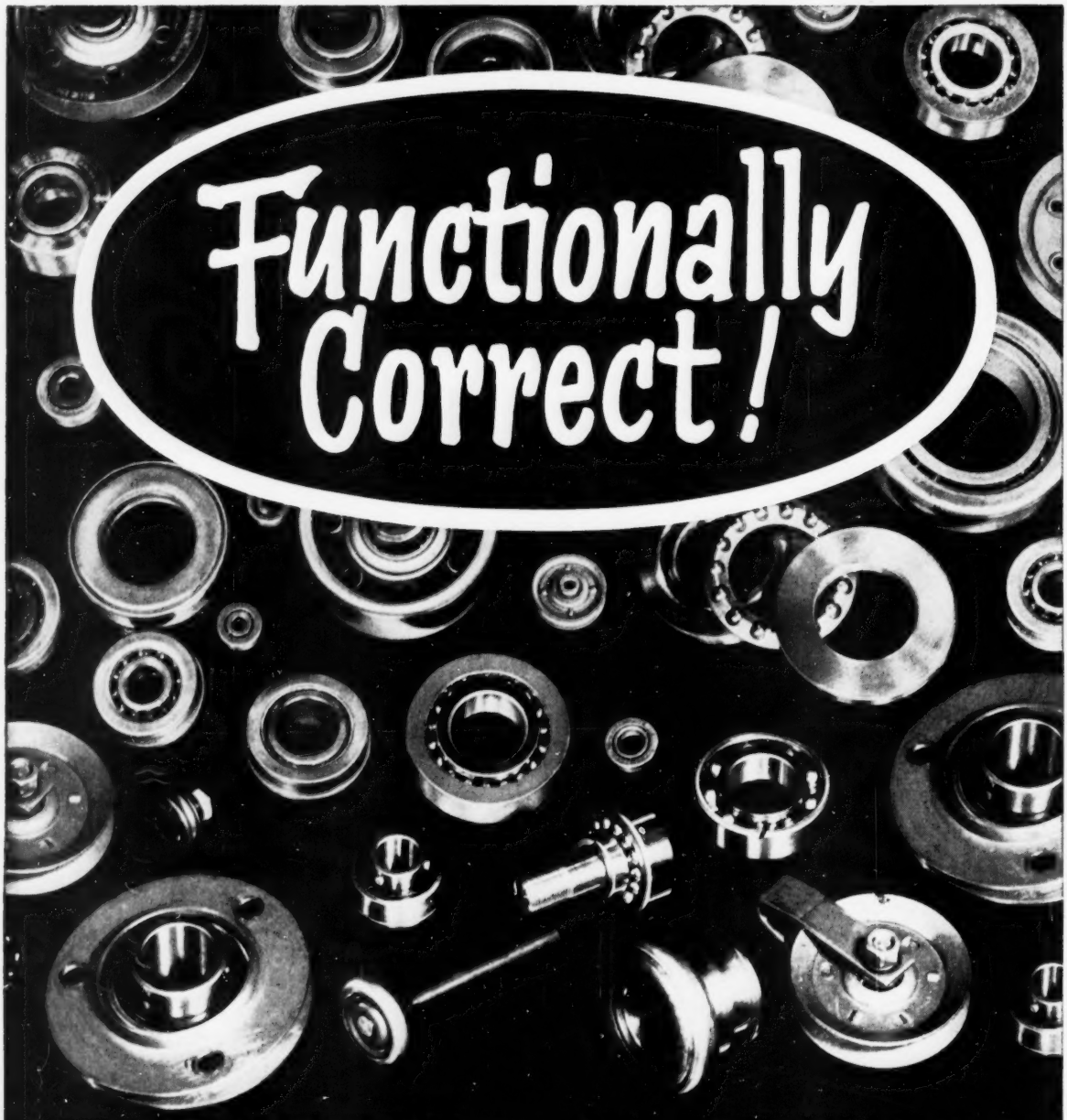

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In product design, FUNCTIONALLY CORRECT means *exactly right* for the job, not more, nor less. Beyond a reasonable safety factor "over-engineering" in the form of excessive capacity, unnecessary precision or unwarranted, expensive materials, may lead to commercial failure; every component part must be designed or selected to be functionally correct at minimum cost.

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Write for New Catalog No. 150

NICE

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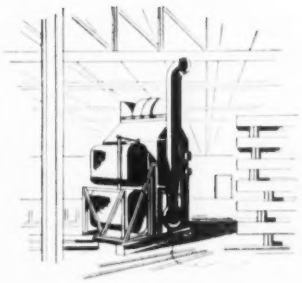
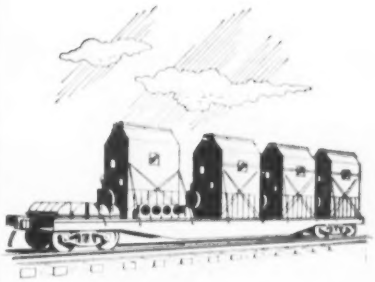
These 12 DRAVO *Counterflo* SPACE HEATERS really got around!

Here's where the Dravo Heater's rugged construction and durability paid off for Ford Motor Company.

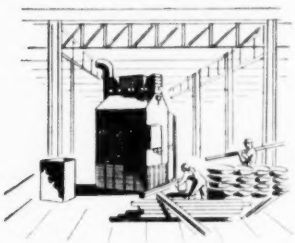
Back in the fall of 1950, Ford purchased 12 Dravo Heaters for temporary heating at Cleveland, Ohio, while Ford's new engine plant was under construction during the winter of 1950-1951.



1 The heaters maintained comfortable working conditions and kept the ground from freezing during zero weather so that concrete could be poured.

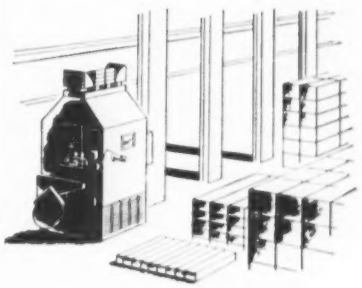


2 After this new plant was completed, four heaters were shipped to Canada and were permanently installed in Ford's warehouse at Winnipeg.



3 The other eight heaters were shipped to Kansas City, Mo., for use as temporary heaters during the construction of facilities similar to those in Cleveland.

4 When that job was finished, the eight heaters were returned to Dravo at Neville Island, Pittsburgh, for overhauling and reconditioning by highly-skilled Dravo personnel.



5 Now these eight Dravo *Counterflo* Heaters have been permanently installed for comfort heating at Ford's assembly plant at Buffalo, New York.

Only Dravo *Counterflo* Space Heaters could stand up under such extraordinary treatment and frequent moving. Dravo Heaters are a product of top-flight engineering and planning; their mill-type, heavy construction means long life, low maintenance and years of satisfactory service.

Dravo Heaters, backed by over 60 years of engineering experience, are available now in a range of sizes from 400,000 to 2,000,000 Btu. Find out how these superior Dravo Heaters can benefit you. Write for more information. Use the coupon.

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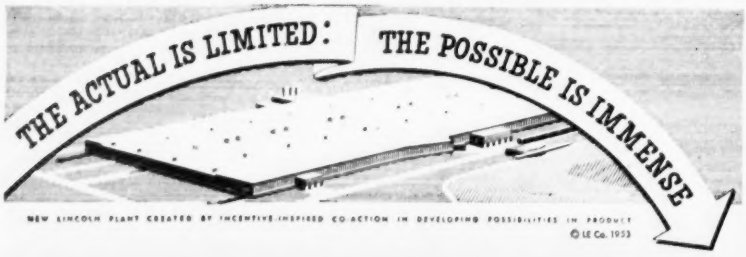
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NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT
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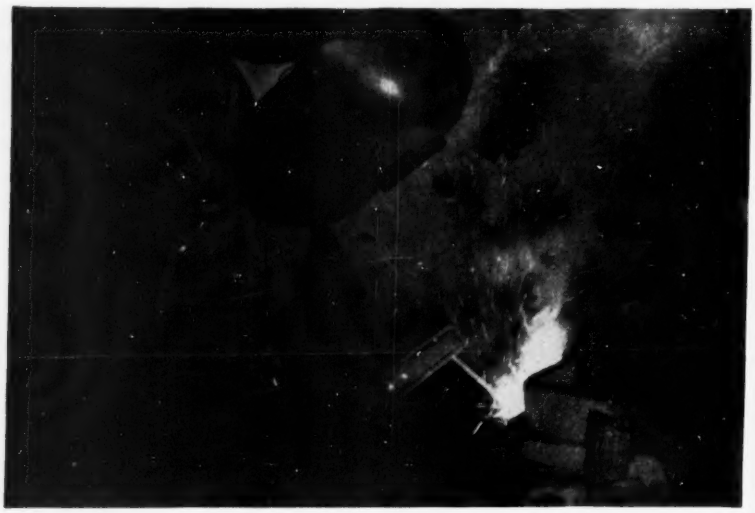

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Welds made with "Fleetweld 72" are smoother, of higher quality. And "Fleetweld 72" has good "wetting" action with minimum arc force.

"Fleetweld 72" operates beyond the breakdown point of other rods . . . without overheating, without excessive arc spatter. Its higher melt-off rate and flatter bead give you more mileage or stretch per length of rod than possible in any E-6012 electrode today. What's more, most welds are self-cleaning.

Readily available, "Fleetweld 72" answers the demands of many production jobs normally specified for E-6013 calling for smooth appearance and easy slag cleaning. Selling for less cost per pound, "Fleetweld 72" further helps you meet the challenge for lower welding cost on a host of production operations.

START CUTTING WELDING COSTS—Latest Speeds and Procedures for production welding with Lincoln "Fleetweld 72" are in the Weldirectory 462. Available by writing on your letterhead to Dept. 1607.

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CLEVELAND 17, OHIO
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

LINCOLN "FLEETWELD 72"

Unique E-6012 Electrode for High Speed Production Welding of Lap and Fillet Welds

Faster, Easier Operation Lincoln "Fleetweld 72" operates with peak efficiency at welding currents substantially above conventional E-6012 electrodes and without danger of breakdown. Weld deposits produced at high melt-off rates are smooth, are slightly convex . . . ideal for all types of flat position production work where duplicate welds must be made in the shortest time to cut shop costs.

Proper Root Penetration The unidirectional arc characteristics of Lincoln "Fleetweld 72" assure correct root penetration of fillet welds . . . with minimum cutting away of the top edge of lap welds, yet without sacrifice in speed.

More Mileage Fleetweld's near-flat bead means top weld strength without piling up weld metal as experienced with other electrodes. This means more mileage per length of rod to cut electrode costs.

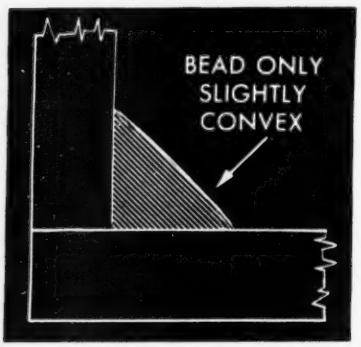


Fig. 1. More Mileage *comes from "Fleetweld 72's" near-flat bead shape. There is no piling up of weld metal.*

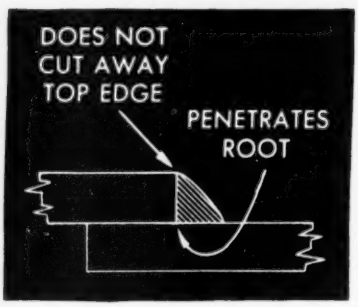


Fig. 2. Quality at Top Speed. *Proper penetration at root is done without cutting away top edge.*

IN PITTSBURGH'S GOLDEN TRIANGLE . . .

34,200 Tons of Steel Frame Construction by AMERICAN BRIDGE in 24 months!

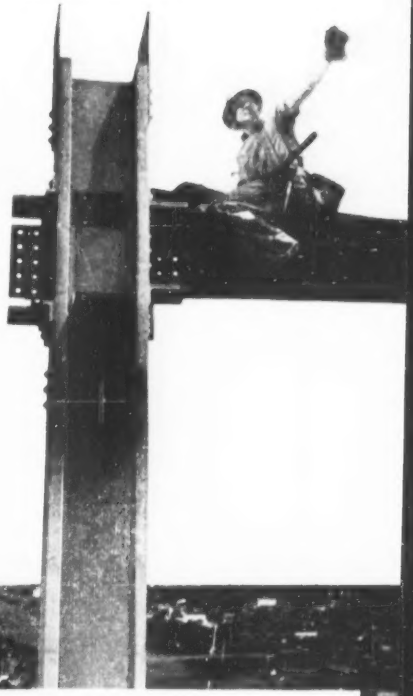
PITTSBURGH'S new buildings have been the talk of the business world. Few cities anywhere have experienced as much commercial construction in so short a time.

For example, in the famous Golden Triangle, busy hub of this hustling metropolis, American Bridge alone erected 34,200 tons of steel framework for six towering new buildings in the two year period between April 3, 1950 and March 31, 1952.

American Bridge fabricated and erected all structural steel for the 41-story building known as 525 William Penn Place; the 31-story Alcoa building; the three Gateway Center buildings (one of which is 24-stories, and two 20-stories); and the 20-story Bigelow Apartment House.

Such an accomplishment is unusual only in the fact that all buildings are located in the downtown area of a single city . . . and that all were under construction at practically the same time. The interesting point is that one company had the facilities, the skilled manpower, and the engineering know-how to handle six sizable jobs like these with such speed and efficiency without disrupting the time schedule of the numerous other construction projects which it was handling in other parts of the country.

It only goes to prove that no job is too large for American Bridge. If you would like to know more about the advantages of American Bridge fabricated and erected construction, call our nearest office.



RECENT ADDITIONS TO PITTSBURGH'S SKYLINE

525 William Penn Place
14,000 tons of Structural Steel

Alcoa Building
6,400 tons of Structural Steel

Gateway Center Buildings (3)
12,000 tons of Structural Steel

Bigelow Apartment House
1,800 tons of Structural Steel

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UNITED STATES STEEL

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Our rate of production is now nearly 70% higher than it was only a year ago. A further expansion within the next twelve months will raise the 1952 level another 20%.

This expansion will enable us to satisfy more than adequately the foreseeable demands of both National Defense and our customers in the iron, steel, automotive, oil, chemical, electronics, and aircraft industries.

We thank all those who have waited so patiently for this moment.

Climax Molybdenum Company

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BOILERS

10 STORIES HIGH!

Three new B-I-G boilers on the West Coast will have all of the cost-saving advantages of B-L tube-supported wall enclosures and Texad* finishes. The order for one of them—a 1,250,000-pound-per-hour unit—has just been placed. Construction on the others—850,000-pound-per-hour boilers is now being started.

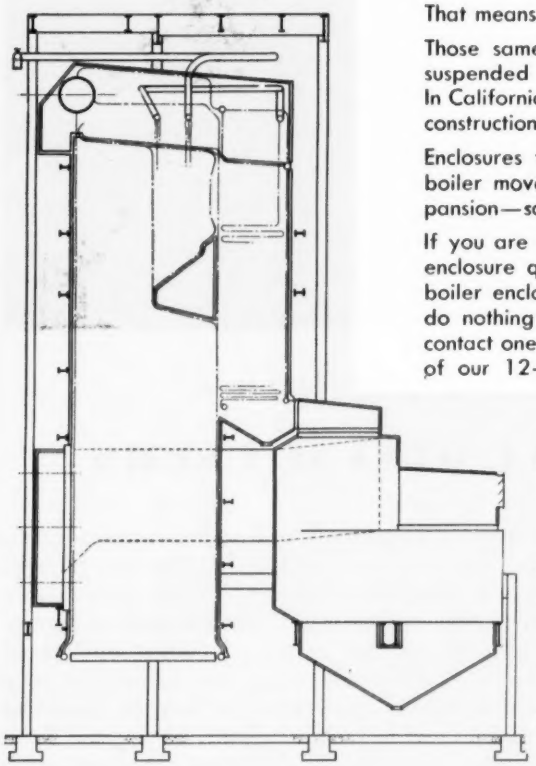
That means they'll cost less, save steel, operate more efficiently.

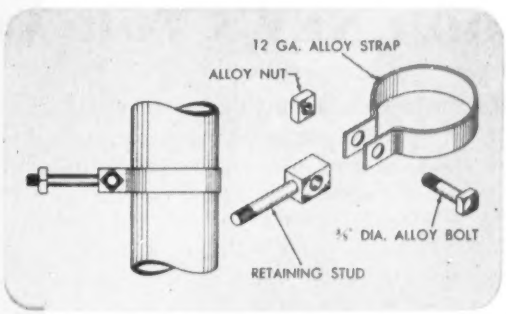
Those same advantages can be earned by specifying Bigelow-Liptak suspended settings for any large size industrial or public utility boiler. In California, for example, the king-sized, 10-story boilers will have lower construction and material costs and will not need tough-to-get steel plate.

Enclosures will be tighter, too. Tube-supported walls breathe with the boiler movements and TEXAD* flexes itself right along with boiler expansion—something that a steel plate casing that large could never do.

If you are building a large boiler, or a small one, insist on a separate enclosure quotation. You'll save plenty and you'll get a specially-made boiler enclosure engineered for your particular furnace by people who do nothing else but build furnace enclosures. Write Detroit today, or contact one of our conveniently-located offices. Be sure to ask for a copy of our 12-page tube-supported wall catalog—and a TEXAD* folder.

*T. M. REG.





One method B-L uses to fasten the enclosure to the tubes without welding into the tube. Tile-supporting castings are hung on the studs.

3133

BIGELOW-LIPTAK *Corporation*

and Bigelow-Liptak Export Corporation

2550 W. GRAND BLVD. • DETROIT 8, MICHIGAN

UNIT-SUSPENDED WALLS AND ARCHES

In Canada: **Bigelow-Liptak of Canada, Ltd., *Toronto, Ontario***

ATLANTA • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DENVER • HOUSTON • KANSAS CITY, MO. • LOS ANGELES • MINNEAPOLIS • NEW YORK
PITTSBURGH • PORTLAND, ORE. • ST. LOUIS • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SAULT STE. MARIE, MICH. • SEATTLE • TULSA • VANCOUVER, B.C.

From deep inside a mountain—

GOOD NEWS FOR ALUMINUM USERS

The availability of aluminum will be increased materially by new production facilities already well into construction at Kitimat, in the mountain wilds of British Columbia. There Aluminum Company of Canada, Ltd. ("Alcan"), whose products we distribute, is building a new plant, which in its initial phase will provide 200 million pounds more aluminum per year.

Abundant low-cost power is needed to produce aluminum economically. To serve Kitimat, a great hydroelectric plant will be installed inside a mountain. Water will travel through ten-mile tunnels, such as the one shown above, and drop half a mile to the power house, located inside a cavern.

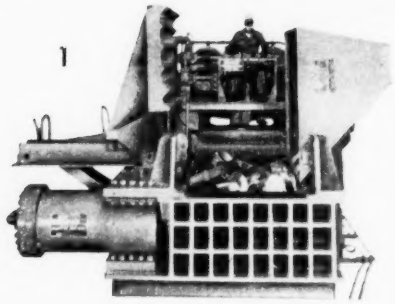
Meanwhile, from existing facilities, millions of pounds of Alcan aluminum are helping to keep over a million metal-workers busy in American foundries and fabricating plants, turning out thousands of lightweight, long-lasting aluminum products for defense, industry, farm, and home.

ALUMINUM IMPORT CORPORATION

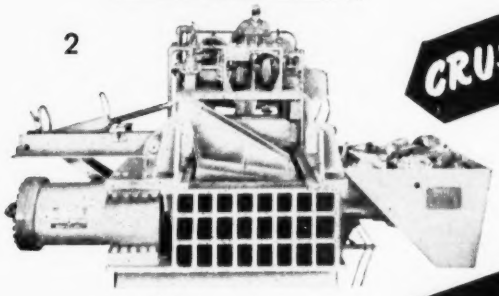
Distributing company of the **ALUMINIUM LIMITED** *group, in the Western Hemisphere*

Offices and agents in 40 cities — *Cable address:* ***ALIMPORT***

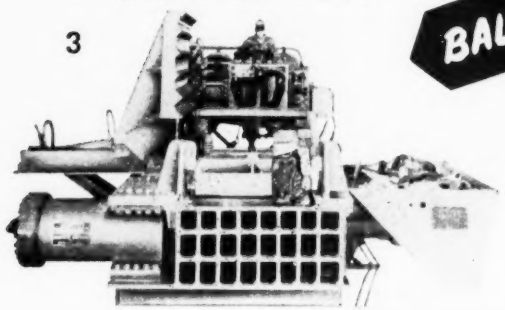
630 Fifth Avenue, New York 20 • 20 North Wacker Drive, Chicago 6 • 505 Terminal Tower, Cleveland 13
510 West Sixth St., Los Angeles 14 • Av. Ing. Luis A. Huergo 1279, Buenos Aires • Rua Da Quitanda 96, Sao Paulo



LOAD IT



CRUSH IT



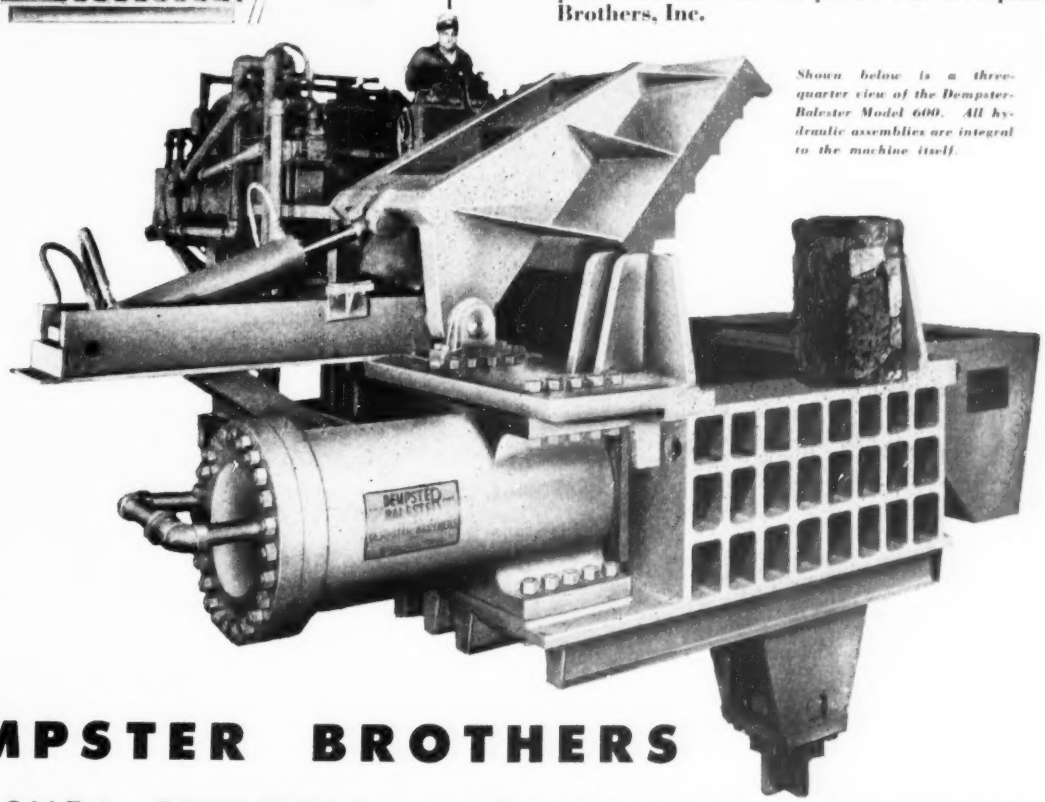
BALE IT

DEMPSTER-BALESTER GIVES YOU ALL 3 HYDRAULIC ACTIONS FOR FAST, CONSISTENT, MORE PROFITABLE SCRAP METAL BALING!

The Dempster-Balester's *"Load It—Crush It—Bale It"* hydraulic action assures you of the fastest scrap metal baling operation . . . the closest approach yet to automatic baling!

It's a simple 1-2-3 continuous operation . . . Skip Pan Loader loads charging box. As Skip Pan returns to re-loading position, Auxiliary Compression Door compresses scrap with a 45-ton force. As Compression Door returns to up-right position, charging box closes . . . scrap is baled and ejected. Skip Pan has been re-filled and is ready to re-load charging box as soon as bale is ejected. As each cycle ends, another begins . . . *Load It—Crush It—Bale It—Load It—Crush It—Bale It* . . . one bale after another.

Without question, Dempster-Balesters are the fastest, most efficient presses baling scrap metal today! And you have six to choose from . . . three standard and three high speed models that turn out high density bales in capacities to meet any requirement from 1 to 9 tons per hour. Write to us today for complete information. A product of Dempster Brothers, Inc.



Shown below is a three-quarter view of the Dempster-Balester Model 600. All hydraulic assemblies are integral to the machine itself.

DEMPSTER BROTHERS

873 SHEA BUILDING, KNOXVILLE 17, TENNESSEE

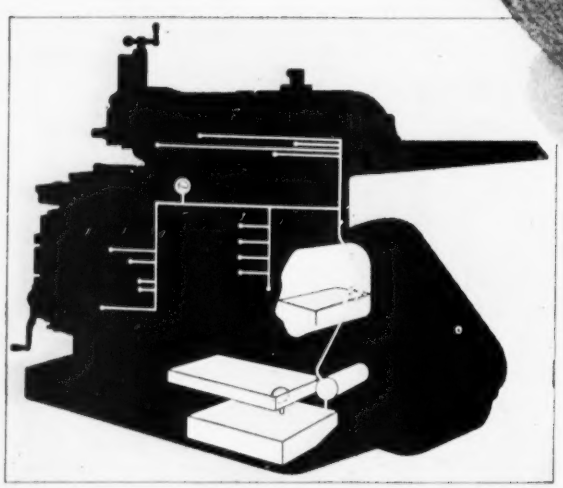
50 lbs. oil pressure

IS NECESSARY WITH A CUT LIKE THIS...

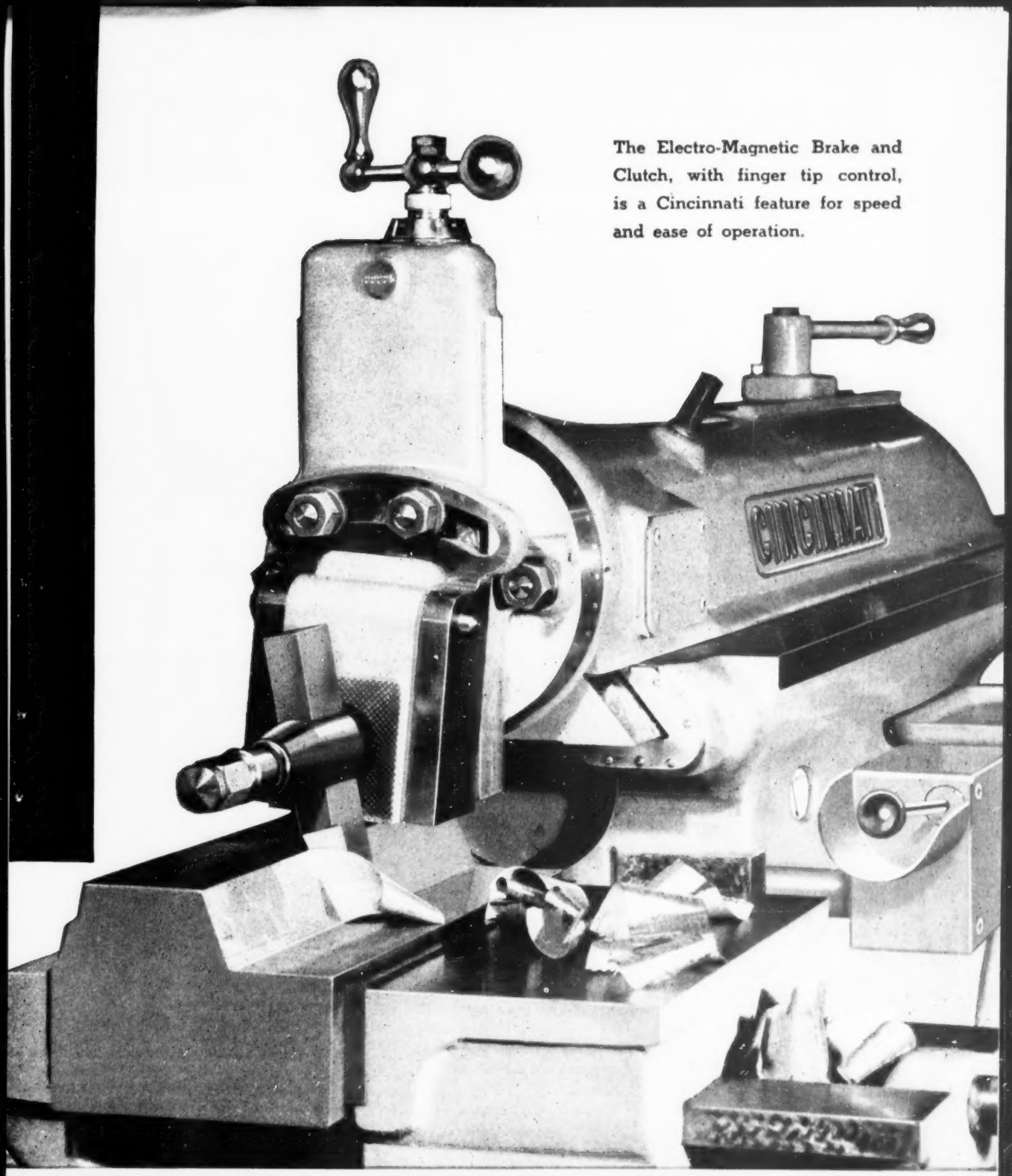
This tremendous cut demonstrates the extra strength, rigidity, and power in Cincinnati Shapers. It also demonstrates the ability of the 50 p.s.i. lubrication system to develop and maintain oil films under the heaviest loads.

Write for Catalog N-5.

Demonstration cut.
Actual size steel chip, 2″ cut .030″ feed
Cincinnati 24″ H.D. Shaper.



50 p.s.i. system includes 50 micro filter, settling basin and reservoir. Transmission runs submerged in oil.



The Electro-Magnetic Brake and Clutch, with finger tip control, is a Cincinnati feature for speed and ease of operation.

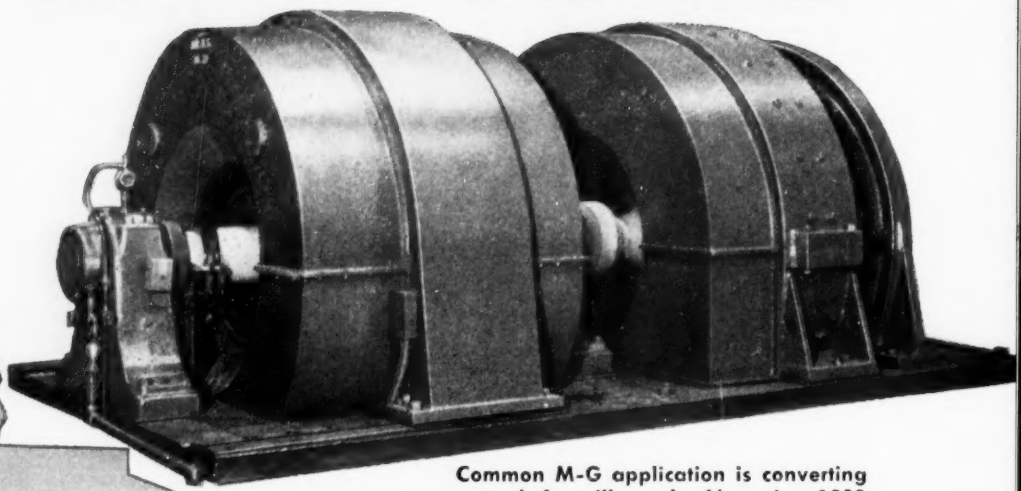
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

CINCINNATI

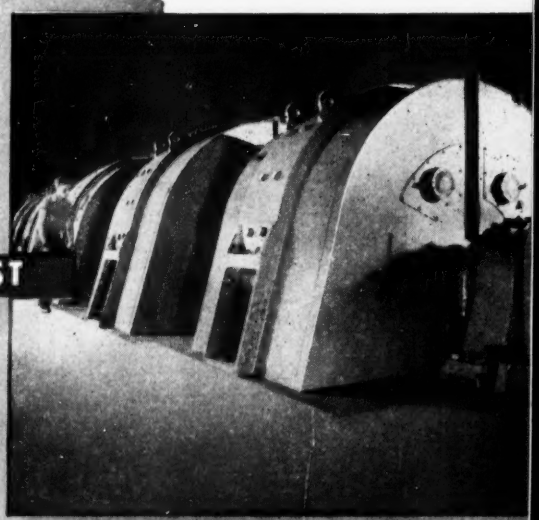
From Coast



Common M-G application is converting ac to dc for mill supply. Above is a 1500 kw synchronous set in eastern mill.

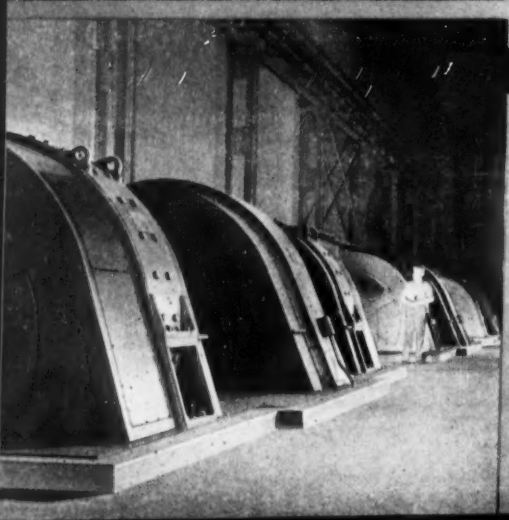
WEST

This 8-machine 2000 kw M-G set supports a two stand, four high tin temper mill with generators opposite their mill motors.



MIDWEST

A 56-inch, four stand tandem cold reduction mill is supported by this 7-machine 7750 kw synchronous motor-generator set.



EAST

Three 3-machine 6000 kw synchronous M-G sets supporting six finishing stand motors in a large East Coast steel rolling mill.

TEMPER MILL

Three midwestern single stand temper mills are supported by these M-G sets. Synchronous motors of 1750 hp drive each set.

to Coast!

ALLIS-CHALMERS M-G SETS ARE WIDELY USED IN SUPPORT OF STEEL MILL DC DRIVES

MAJOR STEEL PRODUCERS from Coast to Coast use Allis-Chalmers motor-generator sets. This nationwide acceptance in heavy duty service is proof of their durability and quality.

These representative M-G sets indicate the wide variety in design and size available. Allis-Chalmers has long experience with steel mill needs — having built M-G sets for all current applications — and will build special for any new requirement that may arise.

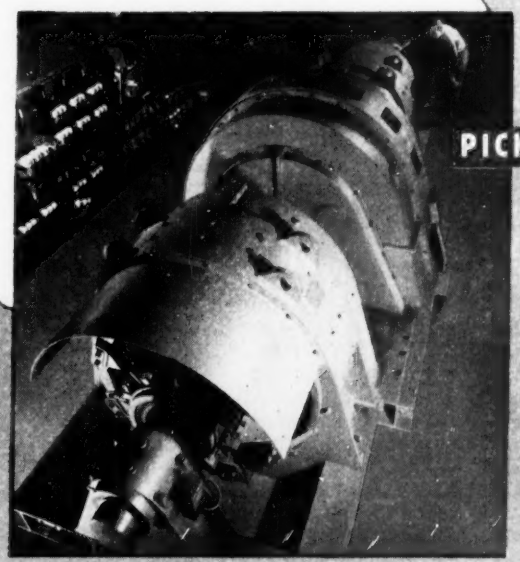
Motor-generator sets give you:

1. Power factor correction.
2. Regenerative braking.
3. Quick starting for emergency demand.

Only Allis-Chalmers gives you M-G sets with the exclusive *Frog-Leg* armature winding that ***eliminates injurious commutator sparking.*** *Frog-Leg* winding connects bars of equal potential through the winding itself . . . producing a perfectly equalized winding without the use of cross-connectors.

For full details on this heavy duty steel mill rotating equipment, ask for M-G Set Bulletin 05B6032A and Large DC Motor Bulletin 05B6002A. For your copies, just call the nearest A-C office or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3920

Frog-Leg is an Allis-Chalmers trademark.



PICKLING LINE

A pickling line in an eastern steel mill is supported by this 4-machine 1375 kw, 720 rpm synchronous M-G set.

RECORD BREAKER

A motor room, completely equipped by Allis-Chalmers, powered this 80-inch western hot strip mill to a new annual world tonnage record.

ALLIS-CHALMERS

Power, Electrical, Processing Equipment for Iron and Steel

A-C ALLIS CHALMERS

superfine finish eliminated buffing on these parts

For the temple bow illustrated, Sunware Products Inc., New Britain, Connecticut, makers of Rayex Sun Glasses, formerly used ordinary drawing brass and finished this part by hand buffing—one at a time.

This was a costly procedure, so a switch was made to Formbrite* . . . then a happy thought occurred:

With Formbrite's superfine grain structure and added surface hardness, why not *tumble* these bows—by the thousands.

It was as simple as that. Formbrite's clean, smooth surface produced a jewelry finish—ready for gold-plating and lacquering. Since these bows are produced by the millions, the savings effected were substantial.

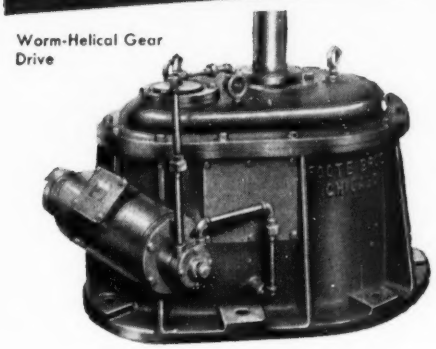
Formbrite, just in case you haven't heard, is a superior drawing brass. Comparative tests prove conclusively that the superfine grain structure of this specially processed forming brass means stamped and formed products that are stronger, harder, "springier" and more scratch-resistant. Yet the metal is so ductile that it can be readily formed, drawn and embossed.

Time studies made of finishing operations have shown that a bright, lustrous finish ordinarily can be obtained by a simple "color buffing" operation—or by tumbling, if the product lends itself to this method.

And yet, Formbrite costs no more. Convince yourself that Formbrite is the metal for your product. Write for Publication B-39. Address The American Brass Company, General Offices, Waterbury 20, Conn. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.

*Reg. U. S. Pat. Off.

an ANACONDA® Product made by The American Brass Company



At Foote Bros. you will find a complete line of enclosed helical and worm gear drives for every job. Ratios and capacities to answer every speed reduction need. Also available to assure long and satisfactory service is a complete line of Foote Bros.-Louis Allis Gearmotors, both vertical and horizontal.

Foote Bros. offers these advantages: Nearly 100 years of design, engineering and manufacturing experience—the latest in gear-cutting techniques—better control of materials. Modern production techniques at three large plants assure superior drives for every power transmission requirement.

Mail coupon for information.

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
4545 South Western Boulevard, Chicago 9, Illinois

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Chicago 9, Illinois

Please send me information on the following:

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☐ Hygrade Drives ☐ Worm-Helical Gear Drives
☐ Foote Bros.-Louis Allis Gearmotors

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Company.....

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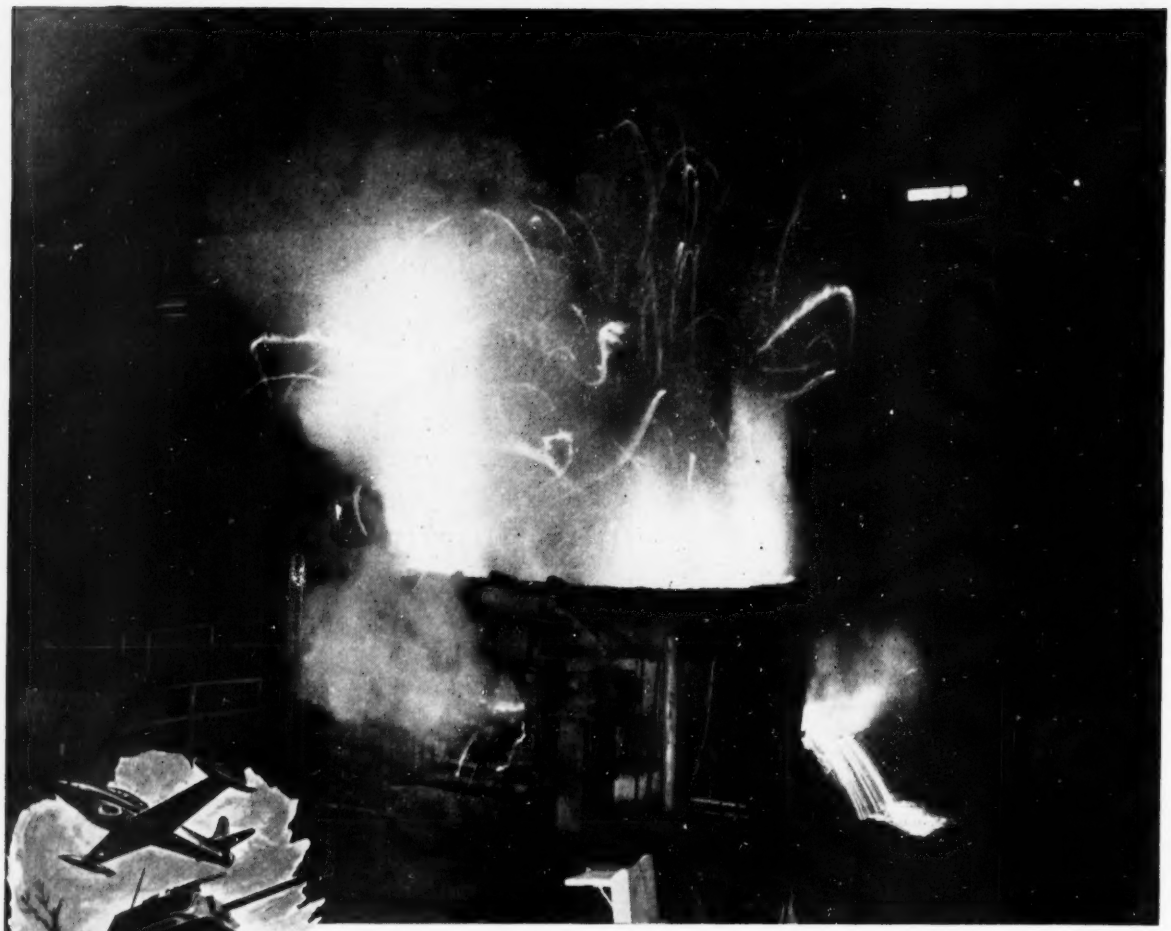
Position.....

City.....*Zone*.....*State*.....



Special Steels for Armament for Industry for the Home

Spectacular Beginning of a SPECTACULAR STEEL

An electric furnace puts on a terrific show when we drop in a charge (as above) but it's only indicative of the great performance the steel will give later in service. For these are the high-alloy steels, stars of the metal world . . . the steels that give you so much more than they cost in resisting corrosion, heat, wear or great stress—or in providing special electrical properties. ● They can help *you* cut costs, improve quality, or add sales appeal. Let's get together on it. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

W&D 4148 B

PIONEERING on the Horizons of Steel

Allegheny Ludlum

AL
LEADING PRODUCER HIGH-ALLOY STEELS

Warehouse stocks of A-L Stainless carried by all Ryerson plants

This Size . . . . ➧

or This Size . . . . ➧

with all "kinds of sizes" in between

SKF's wide range of bearing types and sizes, plus helpful SKF engineering cooperation, makes it possible for you to select the bearing whose characteristics make it the best bearing choice for your particular application.

SELF-ALIGNING BALL BEARINGS

Compensate for angular misalignment resulting from faulty mounting, shaft deflection or distortion of the foundation. For radial loads and moderate thrust loads in either direction.

SPHERICAL ROLLER BEARINGS

Unexcelled for capacity. Inherently self-aligning. The full capacity of the bearing is always available for useful work. Will carry substantial thrust load in either direction.

DOUBLE-ROW DEEP GROOVE BALL BEARINGS

Embody the same design principle as the single-row type, but have lower axial displacement and substantial thrust capacity in either direction. Have very high radial capacity.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Sustain, in addition to radial load, substantial thrust load in either direction even at high speeds. Available with famous Fairprene Red Seals which keep dirt out and lubricant in. Also with any combination of Red Seals, shields, and snap-rings. Furnished in standard or precision tolerances.

ANGULAR CONTACT BALL BEARINGS

Support heavy thrust load in one direction, sometimes combined with moderate radial load. Can be mounted singly or in tandem for constant thrust load in one direction; also in pairs, face-to-face or back-to-back, for combined thrust and radial loads.

CYLINDRICAL ROLLER BEARINGS

Very high radial capacity and low friction which permits high-speed operation. Easy to dismount, even when both rings are mounted with a tight fit.

BALL THRUST BEARINGS

For pure thrust load in one direction only. Not self-aligning. The load line through the balls is parallel to the shaft axis, resulting in high thrust capacity and minimum axial deflection.

SPHERICAL ROLLER THRUST BEARINGS

For heavy thrust loads, or combined loads which are predominantly thrust, at high speeds on vertical or horizontal shafts. Fully self-aligning.

SKF®

BALL AND ROLLER BEARINGS

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.
– manufacturers of **SKF** *and* HESS-BRIGHT *bearings.*

Steel

The World's Largest Stocks

•

Certified Quality—Carbon, Alloy, Stainless

•

Fifteen Plants from Coast to Coast

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Metallurgists and Veteran Steel Men

•

Sawing, Shearing, Flame Cutting

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Immediate Shipment

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This is

RYERSON STEEL SERVICE

PRINCIPAL PRODUCTS IN STOCK: CARBON, ALLOY AND STAINLESS STEELS • BARS • STRUCTURALS • PLATES • SHEETS TUBING • METAL WORKING MACHINERY AND TOOLS • GLYCO BABBITT METAL • RYERTEX PLASTIC BEARINGS

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Coming Up: Mr. Lewis

The John L. Lewis season is coming up. It can start Aug. 1, the earliest the United Mine Workers' chief can file a 60-day notice of a strike which could begin Oct. 1. Rumors about what he will do range from predictions that he has a proposal to allow marginal mines lower wage scales to forecasts that he won't strike this year and will settle for modest gains on the order of the steelworkers' settlement. Odds are Mr. Lewis will be willing to settle quietly for modest wage gains, but he's steamed up about the recent Revenue Bureau decision to tax the miners' pension fund. He may pull some "memorial" strikes to show union power and win a more favorable ruling.

Less Overtime?

Employers are cutting overtime as one way to cut costs. Steelworkers labored an average 39.9 hours a week in May, compared with 41 hours a week in April. And other industries are trying to keep away from having employees work more than 40 hours in seven days. The effect of the efforts shows up in just-released profit figures for the first quarter. Although sales in the first three months were lower than in the previous quarter, profit before taxes increased, partly due to less overtime. But you can't win. Profits after taxes dropped in the period (p. 44). Although the excess profits tax continues until Jan. 1, watch for still less overtime.

BSA Has Budget Troubles

The administration is trying to untangle a snarl in the Senate over appropriations for the Commerce department's new Business Services Administration. BSA is supposed to take over from NPA to administer the controls system on Aug. 1. BSA's formation has been delayed already by slow legislative action and may be again. When BSA finally does get organized, it will function through industry divisions to be headed by volunteer executives from industry, plus advisory groups much like the present National Petroleum Council. Blueprints for groups in steel and aluminum have already been drawn.

New Customers: 300 an Hour

You're getting 300 potential new customers an hour in the U.S. and will have 200 million potential ones by the year 2000, compared with about 160 million now. Those are population and birth-rate estimates by Population Reference Bureau, a private study organization. World markets are gaining at comparable speeds, and the bureau estimates that the population of the globe will double by the year 2000, with 70,000 people added every 24 hours.

Industrial Property Prices Hold

Expect prices for industrial property in the next six months to remain constant, compared with levels in the first part of 1953. So says National

Metalworking Outlook

Association of Real Estate Boards. In heaviest demand are single-story structures, but even most multiple-story factories can be sold readily. The biggest shortage of one-story buildings is in Illinois, Indiana, Michigan, Ohio and Wisconsin.

What Air Conditioning Does

Here's what the air conditioning boom is doing to at least one company: Fedders-Quigan Corp., Maspeth, L.I., N.Y., in 1948 did 6 per cent of its business in production of room air conditioners. This year air conditioning will account for some 60 per cent of Fedders' volume. The company also still makes car and truck radiators, automotive heater cores and convector and wall-fin radiation.

Rescue for Roads?

Some $40 billion in roadwork is needed to get our highways in shape, says American Road Builders Association. Automobile Manufacturers Association says the nation's drivers are paying a penalty of at least $3 billion yearly because of unsafe and inadequate roads. Watch for a joint congressional committee to be formed to study the matter and, eventually, some positive legislative action.

The Photo in Industry

Two out of every three dollars' worth of photographic equipment and supplies sold by U.S. and Canadian photographic manufacturers last year went into industrial, business, governmental or scientific uses, or nearly $530 million. And industry's share is rising. Three years ago, Eastman Kodak Co.'s sales for business and industrial uses exceeded sales for amateurs for the first time. Industrial pictures are taken for publicity purposes; to record positions of heating, power and water lines; to record safety violations and many other uses.

Straws in the Wind

Ammunition production will continue at present high rates for several months after a Korean truce . . . New broad standards allowing more horsepower to a frame size for all of the popular alternating-current motors from 1 to 30 hp have been set by National Electrical Manufacturers Association . . . The May layoff rate in the machinery, except electrical, industry was 13 per 1000 employees, the highest since 1949.

This Week in Metalworking

Machine tool shipments may hit $1.2 billion in 1953, then slip moderately to $950 million in 1954 (p. 43) . . . Defense department next year will require all its suppliers of steel and nonferrous alloys to "birthmark" their products with an identification system now being developed (p. 46) . . . U.S. Steel Corp. has a 49 per cent interest in a French company to develop an African manganese deposit (p. 46) . . . Airframe makers could use 565 per cent more titanium (p. 47) . . . The Defense department's cutback of the tank-truck program involves no reduction in the number of units to be built, just slower deliveries (p. 49).

the 3rd. DIMENSION

May be the difference Between PROFIT and LOSS

Here's how *MicroRold*® Stainless Steel *Saves You Money*

The third dimension, or gauge thickness, is extremely important in the purchase and use of stainless steel. Job costs are figured on a square foot of stainless area basis while stainless sheets are purchased on a weight basis. Each one-thousandth inch saved in thickness saves 1.26 pounds per sheet.*

When sheets are ordered by gauge number, the permissible A.I.S.I. variation in thickness is plus or minus 10%. Thus, if you order 18 gauge you may receive sheets .052″ thick, when a thickness of .0475″ would suit your purpose. Using a standard 18 gauge 36″ x 120″ sheet as an example, the theoretical weight is 63.00 pounds, but this weight could permissibly vary between 59.22 pounds and 65.52 pounds.

MicroRold sheets may be ordered by gauge number and you may specify they be rolled on the light side of the gauge range. This is true because the company's equipment is such that more accurate control of thickness is possible.

If you are not a user of MicroRold sheet it will pay you to get the full details. Your steel warehouse distributor will gladly tell you the MicroRold story.

*36″ x 120″ standard size sheet.

WASHINGTON STEEL CORPORATION
Washington, Pennsylvania

DUCTILE IRON GEARS provide *Superior Strength* with *Excellent Resistance to Wear*

Large Gears... such as these Ductile Iron girth gears drive large tube mills in the cement and mining industries. Put into service without heat treatment, they normally provide 92,000 to 100,000 psi ultimate tensile strength, 3 to 5% elongation, and 270-290 BHN on the tooth surface.

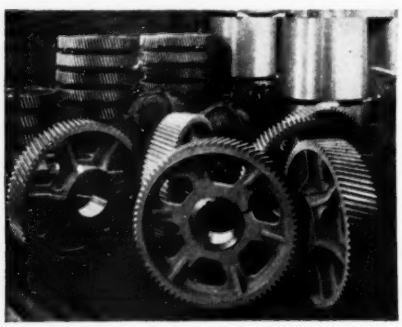
In addition to excellent castability, ready machinability and moderate cost, Ductile Iron offers properties that are vital in a gear material.

For along with high strength and measurable ductility, Ductile Iron "as cast" combines good resistance to wear and galling, with superior values for notched endurance limits.

Ductile Iron can be heat treated to provide tensile strengths of over 150,000 psi. It develops surface hardnesses of over 600 BHN after flame or induction hardening. Service data show also that annealed Ductile Iron develops impressive properties which result in peak performance.

Ductile Iron can provide a chilled, carbidic, abrasion-resistant surface supported by a tough ductile core. No other single material combines these properties. Still another advantage is its ability to damp out vibrations that otherwise might build up stresses to dangerous levels.

Send us details of your prospective uses, so that we may suggest a source of supply from some 100 authorized foundries now producing Ductile Iron under patent licenses. Request a list of available publications on Ductile Iron . . . mail the coupon now.



Medium Gears produced in heat treated Ductile Iron have replaced steel gear castings and forgings in papermaking and allied equipment. Annealed Ductile Iron can be machined at a rate of 2 to 3 times that of good quality gray iron of comparable hardness.

The International Nickel Company, Inc.
Dept. 20, 67 Wall Street, New York 5, N. Y.

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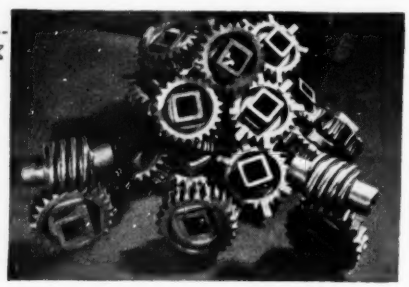

Small Gears . . . also worms . . . exemplify an application of Ductile Iron in the railroad field.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Conserving Manpower

On their way to work this morning passengers in a rapid transit car observed a lake vessel equipped with a self-unloader unloading limestone at a blast-furnace dock. The long conveyor belt was discharging the white stone at a lively rate. This prompted one passenger to remark "Just think of how much labor that conveyor saves! There's only one workman in sight."

This illustration of a simple labor-saving device which is commonplace at lower lake ports serves to remind us that never in the history of our country has the transfer of labor from man to machine been progressing as rapidly as it is today. Evidence of this abounds in many lines of activity.

For instance, Otis Elevator Co. estimates that 80 per cent of its elevators installed in office buildings in 1953 will be of the operatorless type, in which ingenious electronic equipment does practically everything that a human operator can do in handling an elevator. Automatics accounted for only 12 per cent of Otis office building business in 1950, 32 per cent in 1951 and 58 per cent in 1952. This jump from 12 to 80 per cent in four years is significant.

Companies which have a lot of tabulating work to do are finding that electronic business machines can save a surprising amount of manual labor. On a typical job of handling inquiries which formerly required the services of 23 persons, electronic business machines are doing the work with the assistance of only five persons.

These and other instances of how machines are conserving manpower are particularly interesting in view of the recent warning issued by the National Planning Association that the United States faces a serious manpower problem. It says men in Russia outnumber those in America by 40 million and suggests that the remedy of our existing shortage lies in "upgrading" our workforce by bringing marginally-employed workers up to their capacity and elevating scientific personnel so that their talents may be fully utilized.

Is it not probable that our progress in substituting machines for manual labor may prove to be the best means of combating the nation's manpower problem!

E. L. Shaner

EDITOR-IN-CHIEF

TO BIRTHMARK ALLOYS: A proposal to adopt a uniform marking system to identify steel and nonferrous alloys has been approved by the Department of Defense (p. 46) and steps are being taken to make such identification mandatory on Army, Navy and Air Force procurement contracts beginning some time next year.

While details of the marking system have not been fully determined, it is expected that specifi-

cations, when worked out, will provide for inking or stencilling alloy products with the appropriate SAE, AISI or other number, brand or name of the producer, size, heat number, character of heat or other treatment and possibly some other information. The main objective is to provide a single, uniform code whereby the markings will have the same significance in any warehouse or consuming point throughout the country.

Such birthmarking will add somewhat to the cost of alloys but at the same time it will save a lot of money now lost through confusion as to the identity of metal products.

* * *

NEED MORE TITANIUM: A study made by Boeing Airplane Co. for the Aircraft Industries Association of America Inc. (p. 47) indicates that the aircraft industry can use 565 per cent more titanium than is available to it now. Today airframe builders are using about 1250 tons of commercially pure titanium and 1900 tons of titanium alloys annually. According to the Boeing study, when certain technical problems are solved and when more sponge titanium is available at lower prices, airframe builders could use 2200 tons of pure titanium and 18,750 tons of titanium alloys annually.

The cost of refined sponge titanium has dropped from $20 to $5 per pound and will go lower as more efficient refining and production methods are developed. Two producers of titanium sponge are expanding their operations, a third is getting into production and a fourth may enter the field soon. The number of companies equipped to convert sponge to finished products is growing. Perhaps the strong demand for titanium will be met at an earlier date than now seems possible.

* * *

SERVICE IS IMPORTANT: At 9:05 a.m., while a Baltimore purchasing agent was looking through his mail, his phone rang. Lifting the receiver, he heard "Los Angeles calling." Then his good friend, a salesman for a southern California distributor of aircraft hardware, was on the wire. He explained that some stainless steel machine screws which the Baltimore outfit had been seeking could be shipped the following day from Rockford, Ill. Did the Baltimore P. A. want them? He did and said so, but he also thought of the time differential between Baltimore and Los Angeles. "Good heavens," he asked, "what time is it out there?" "A little after six," was the reply.

The point of this true story (p. 54) is that service is 90 per cent of the job of selling and distributing numerous products. Westerners who call their eastern customers as early as 6:00 a.m. prove that they know what service means.

* * *

EFFECTIVE SUBSTITUTES: One of the great achievements of the metalworking industry during the past three years has been its ability to use substitutes to make up for shortages of important materials. An excellent illustration is found in the field of metal plating. Between the end of World War II and the beginning of the Korean trouble, the use of bright nickel - chrome finishes reached unprecedented levels.

Then came the necessary restrictions on the use of nickel. This caused thousands of manufacturers to go all out in their search for and development of suitable substitute finishes. The smaller amount of available nickel (p. 84) was stretched to almost fantastic lengths by using thinner coatings and by using heavier copper undercoats to compensate. Chromium over copper has been a favored substitute. Zinc, white brass and other expedients have helped.

The pay-off is that in spite of nickel shortage, the volume of plated work today is greater than ever.

* * *

SENSIBLE RECREATION: Many metalworking companies go in for company sponsored recreation in a big way. The National Industrial Recreation Association estimates (p. 55) that 30,000 manufacturing companies will spend $800 million on recreational (social, cultural and athletic) activities in 1953. This is more than double the amount spent in 1948 for the same purpose.

Some of these millions will be spent wisely and some will be wasted. An important test is whether or not company sponsored recreation reduces employee turnover. Experience proves that in most cases a little help from the company to implement the desires of recreation-minded employees is far more effective than a program developed by the company and foisted upon employees willy-nilly.

Toss your ring problems to a specialist

Do you require quantities of a circular steel part, machined to an irregular surface contour? Cleve-Weld can provide you blanks shaped so nearly to your needs that rough-machining is largely or entirely eliminated. This may save you as much as 50% on raw material... as well as the cost of machining away the excess!

More than 40 years' specialization in the fabrication of rolled-and-welded steel parts gives Cleve-Weld engineers the know-how and facilities to save you real money on the quantity production of rims, rings, motor and generator frames, gear ring blanks and other circular steel parts more than six inches in diameter.

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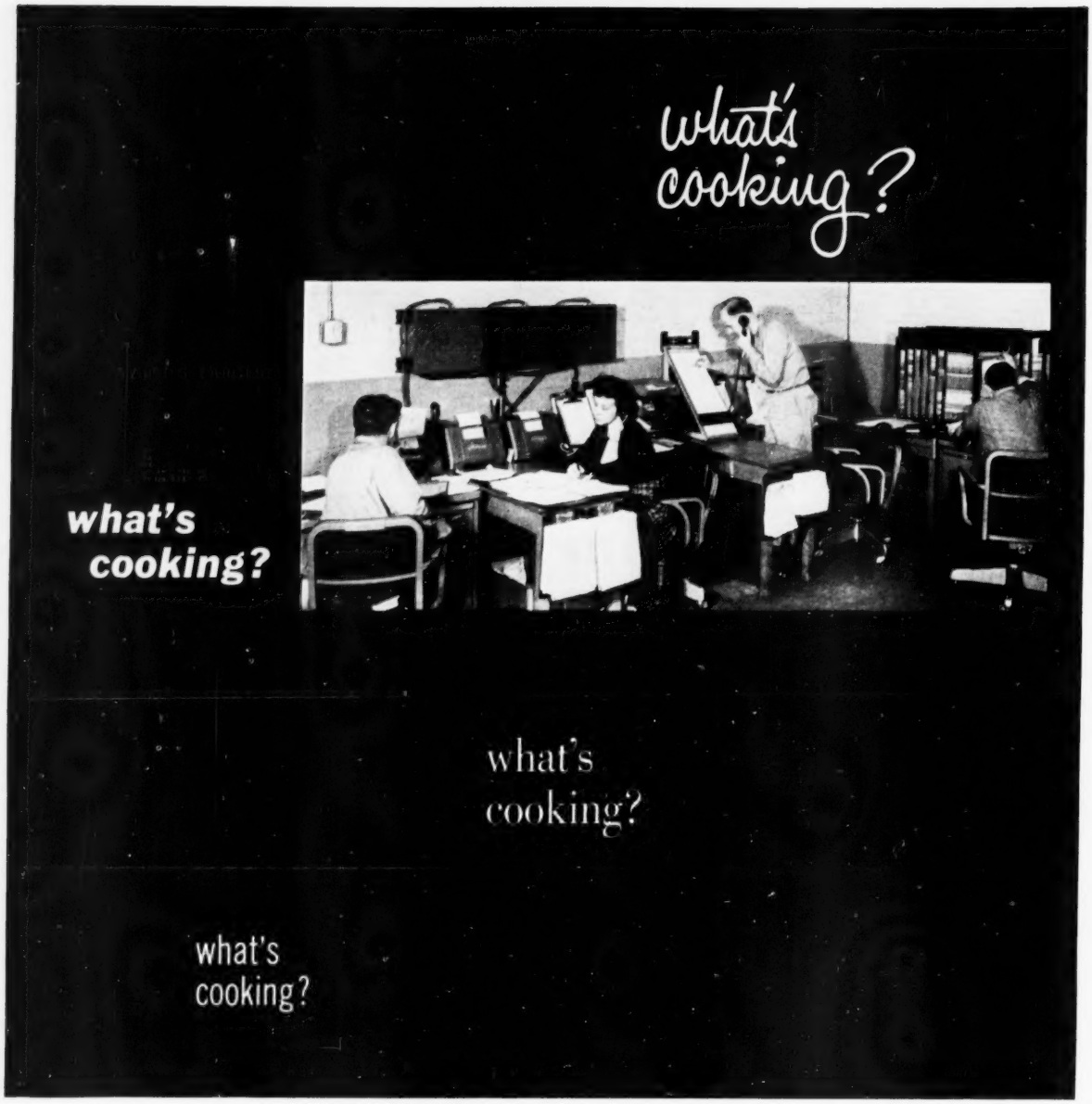

This is the Hot Desk at Inland's central providing office located right in the middle of the open hearth line. It's where Quality Control and Production Control join up. As each heat of steel goes through its open hearth cycle, the Hot Desk gets constant progress reports by phone and telautograph. The metallurgists here re-check customers' orders; see that every heat is made to meet a customer's specifications; start a new heat within 15 minutes if some "spec" is not met precisely.

INLAND *Every hour of the year, Inland steelmakers at the Hot Desk keep us on our toes in serving customers.*

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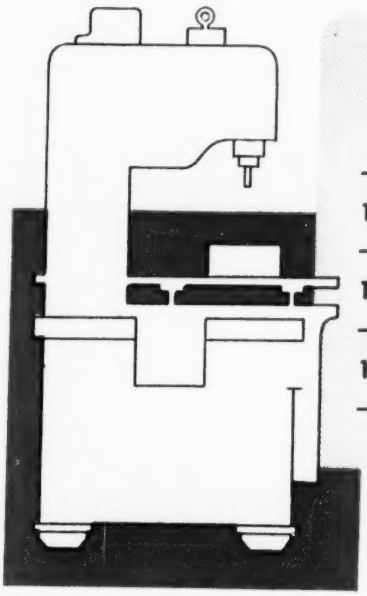


MACHINE TOOL SHIPMENTS

1952	$1,125,900,000
1953	$1,200,000,000*
1954	$ 950,000,000*

Source for 1952: National Machine Tool Builders' Association
* Estimated by STEEL

Tool Sales: Bottom Falling Out?

Shipments are up, new orders are down, but that doesn't mean the bottom is falling out. This is a chance to eliminate inefficient production, reduce an unhealthy heavy backlog

MACHINE TOOL builders, who are not noted for their unrestrained optimism, foresee $1.2-billion shipments of metalcutting machine tools this year and only a 20 to 25 per cent drop in shipments next.

This bellwether industry thus points to continued strong activity for the same period among metalworking manufacturers who use machine tools.

Statistically Speaking — True, volume of new orders has been declining steadily for months; National Machine Tool Builders' Association index of new orders (1945-1947 = 100) was 247.2 in May, 1953, compared with 276.8 a month before and 284.6 a year ago. True, the "average backlog," a rather general figure, has been dropping until it stands at only 7.5 to 8 months currently when it was 18 months at this time in 1952.

But the new order index seems to have stabilized at about its level of the last six months (June orders came in better than May) and shows a better product mix. No type of machine tool is making spectacular new order records; a healthy across-the-board ordering prevails, indicating a general business build-up. Even the auto industry shows signs of further ordering. Then, too, these orders won't have to wait as long for delivery as those of 1950 and 1951; there's less chance of cancellations on the short term delivery.

Another Tack—The machine tool industry can eliminate overtime, third shift operations and subcontracting before declining new orders are viewed with alarm. And by reefing these boomtime sails, the industry can operate profitably at a much smaller volume than at present without laying off any employees. "Overload business which was asked of the machine tool industry was accomplished only through high-cost subcontracting and overtime. If we can get rid of these inefficient means of production and reduce the unhealthy heavy backlogs, everyone will be happier," says one tool builder.

Several factors bolster the outlook for 1954 beyond what the tool builders can do to make their own operations more efficient. New ordering is expected to level off at an annual rate of about $400 million. Replacement markets will be the primary target for civilian sales, increased competition in consumer durable sales giving impetus to new tooling (see STEEL, July 13, p. 60).

Tool builders hope this market gets the benefit of more realistic depreciaton allowances (see p. 59). Tooling for stand-by mobilization plants may cut tool builders in for some of the $500 million written into law for stand-by plant purposes. With an even break on these factors, tool builders, generally, think the shipments for 1954 can drop 20 to 25 per cent under 1953 levels without endangering the industry.

Reservation—All builders hasten to add, however, that reversals in the national or international situation could drastically revise this outlook.

And there are other pitfalls to be kept in mind in generalizing on the machine tool industry, they say. Totals and averages rarely reflect the situation within a particular company or for a particular type of machine tool. For example, the "average backlog" as noted above is now 8 months, but Cross Co. in Detroit reports its backlog is about 18 months, the same or a little greater than a year ago. The answer: Cross builds automotive transfer equipment; heavy, specialized machines. A midwest lathemaker reports his backlog is not more than 4 months; his product being a standard tool. Other builders, especially of light, standard equipment, can ship immediately.

But the industry as a whole is rolling ahead on the momentum of orders built up over the past two or three years and sees no dark doom ahead through 1954. As Jerome A. Raterman, president, Monarch Machine Tool Co., Sidney, O., sums it up: "With the present outlook, the machine tool industry can now settle down to a considerable prosperity."

THE PROFITS PICTURE—All Manufacturing Corporations

(in billions of dollars)

	1952				1953
	1st Q	2nd Q	3rd Q	4th Q	1st Q
Sales	60.6	61.4	60.7	67.5	66.0
Costs and expenses	54.6	55.8	55.4	61.9	59.4
Net operating profit	6.0	5.6	5.3	5.6	6.6
Other income—net	0.1	0.1	0.1	0.2	
Net profit before Fed. taxes	6.0	5.7	5.4	5.8	6.6
Provision for Fed. income taxes	3.4	3.1	2.8	2.9	3.8
Net profit after taxes	2.6	2.6	2.6	3.0	2.8
Cash dividends	1.3	1.3	1.2	1.7	1.3
Retained earnings	1.3	1.3	1.4	1.2	1.6

Source: Securities & Exchange Commission

First-Quarter Profits After Taxes Hit $2.8 Billion

NET PROFIT AFTER TAXES of U. S. manufacturing corporations in the first quarter of 1953 amounted to $2.8 billion. This was well below the all-time peak achieved in the corresponding quarter of 1951, according to the Securities & Exchange Commission.

The top chart spotlights the profit position. A glance at it points out the fact that sales, net profit after taxes and assets during the first quarter were higher than a year ago. However, compared with the October-December period of 1952 sales and profits after taxes were lower and assets somewhat higher.

Underlying all these changes and most important in the final analysis to manufacturers is the amount of net profit after taxes per dollar of sales. In the first quarter it totaled 4.3 cents. A quarter earlier it was 4.4 cents and a year earlier, 4.2 cents.

The chart below, pertaining to the various metalworking fields, highlights the fact that all segments of metalworking increased their net profit before taxes during the January-March period, compared with the previous three months, yet their net profit after taxes showed improvement only in machinery, except electrical.

THE PROFITS PICTURE—In Metalworking

1st quarter 1953

(in millions of dollars)

	PROFITS BEFORE TAXES			PROFITS AFTER TAXES		
INDUSTRY GROUP	4th Q 1952	1st Q 1953	Percent Change	4th Q 1952	1st Q 1953	Percent Change
Primary nonferrous metals	203	260	+ 28	127	127	0
Primary iron and steel	511	585	+ 14	257	228	− 11
Fabricated metal	237	286	+ 21	119	118	− 1
Machinery (excl. elec.)	550	644	+ 17	243	262	+ 8
Electrical machinery	494	526	+ 6	212	194	− 8
Transportation equipment (excl. auto.)	185	196	+ 6	76	69	− 9
Motor vehicles and parts	703	857	+ 22	278	269	− 3
Instruments, etc.	110	115	+ 5	50	44	− 12
Miscellaneous	72	73	+ 1	34	35	+ 3

Note: Figures are rounded and will not necessarily add to totals.
Source: Securities & Exchange Commission and Federal Trade Commission.

ASME Meets on Coast

The meeting in Los Angeles indicates growing engineering activity in southern California

NEARLY 1500 engineers and more than 5000 visitors combined to make the American Society of Mechanical Engineers meeting in Los Angeles "the most successful technical meeting of engineers ever held on the West Coast."

That's the way Clifford M. Sandland, chairman of the Southern California Section of ASME, described the meeting at which 50 technical panels covered subjects ranging from aviation materials handling and gas turbines to fuels and production engineering.

Problem Future — Highlights of the various addresses included a warning by A. C. Rubel, vice president, Union Oil Co. of California, that "the current rate of petroleum production will decline within three years, if new reserves are not developed." Mr. Rubel said today's availability of petroleum products is 8,159,000 barrels daily of a total known producible reserve of about 30 billion barrels. Current production is 7,204,000 barrels a day.

"The Korean war has proven that power plants in U. S. planes need more development," asserted F. L. Wattendorf, technical advisor, USAF; John Noyes, project engineer, Sverdrup & Parcel Inc., and A. I. Ponomareff, Westinghouse Electric Corp., as they described the Air Force propulsion wind tunnel of the Arnold Engineering Development Center at Tullahoma, Tenn.

New Officers — Nominated for 1954 national president of ASME was Lewis K. Sillcox, vice chairman of the board, New York Air Brake Co., N. Y. Nominated for vice presidents: Region I, Willis F. Thompson, vice president, Wescott & Mapes, New Haven, Conn.; Region III, Prof. William G. McLean, Lafayette College, Easton, Pa.; Region V, Thompson Chandler, Carbide & Carbon Chemicals Co., South Charleston, W. Va.; Region VII, Vernon A. Peterson, Elliott Co., Los Angeles, and Region VIII, Prof. C. H. Shumaker, Southern Methodist University, Dallas, Tex.

A new man gets tips on how to be a rougher on a roughing mill as . . .

Pittsburgh Steel Does a Training Job

In manning its new sheet mill, the company for the most part used men with no experience in that rolling operation. Here's how production was started—successfully

WHAT DO YOU DO about your labor when you have to man a new plant to produce an unfamiliar product?

Pittsburgh Steel Co. faced that problem when it plunged into the sheet steel field with a new $28-million mill at Allenport, Pa. With a long background of making wire steel and tubular products, the company went into sheet production with hardly a bobble, using employees having practically no previous sheet mill experience.

Here's How—The first of three steps to solving the problem of inexperienced personnel was to fill major management positions. A core of experienced men was rounded up and placed in key posts. The second factor was instruction of turn foremen in the principles of sheet production. The supervisory team's first job was to start a foreman training program. That program saw all foremen assigned to the sheet mill from other departments for a six-month course which ran eight hours a day. A third step was the method of selecting hourly employees to work in the new unfamiliar jobs at Allenport.

On that last phase, top management and United Steelworker officials sat down together and worked out a formula for assigning men. Personal interviews screened the men best qualified for sheet mill training because there were three applicants for every job. The largest source of manpower was the pool of more than 300 men who had been working in the company's Pilger Mill at Allenport. Most of those men became eligible for new assignments when that phase of Pittsburgh Steel's tubular production was assumed by other departments, and those employees were allowed first crack at jobs in the new mill.

Time for Training — With men chosen for the various jobs, an intensive training program began. Hourly workers were assigned for training under the direct supervision of veteran rolling mill men. The instructors first taught the newcomers, then stood at their shoulders when the new crews were ready to take over.

After some dry runs, the first slab came through successfully. So, only 20 months after ground was first broken for the mill, production was started by men who—with the exception of a handful of training supervisors—are only now getting their first look at a modern sheet mill in operation. However, most of the men had experience in other steel operations. They expect to be producing at the new mill's full-capacity rate of 600,000 tons annually by early next year. First shipments were made in June.

Republic's Net Profits Increase

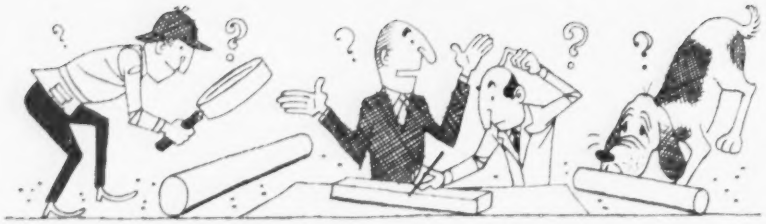
Republic Steel Corp. says its consolidated net income for the first six months of 1953 totaled $28.7 million, equal to $4.72 per common share and 81 per cent higher than in the strike-ridden first six months of 1952. Steel ingot production, steel shipments and sales in the first half of 1953 broke all previous records for any six-month period.

Net income for the second quarter of this year amounted to $14.9 million, as against $4.5 million in 1952. Net income for the second quarter was equal to $2.46 per common share, an increase over the first quarter income which was at a rate of $2.26 per share common.

CF&I To Open Tube Mill

Colorado Fuel & Iron Corp. is putting the final touches on its new $30-million seamless tube mill at Pueblo, Colo. Steel billet rounds are now being rolled on an experimental basis at Pueblo, and the first lengths of seamless pipe should be produced in the third quarter, says the corporation. Formal opening of the mill is scheduled for October.

The new mill, covering a full ten acres, consists of five rectangular buildings joined side by side. Included in the production equipment are two 304-ton piercing walls, a 275-ton rolling mill, expanding mills and a sizing mill and ten overhead cranes to move the pipe from station to station during production. Annual capacity of the mill is estimated at 175,000 tons. It will produce the first seamless oil country pipe west of the Mississippi.



Alloys will be easier to identify, now that . . .

Birthmarking Plan Wins Defense O.K.

By early 1954, the Defense department will require its suppliers to identify steel and nonferrous alloys by a uniform marking system now being developed

THE AIR FORCE PROPOSAL for the adoption of a uniform marking system to identify steel and nonferrous alloys by specification has been bought by the Department of Defense.

The Defense Supply Management Agency has been instructed to prepare a suitable marking specification. After it comes up with such a description—which probably will be around the beginning of 1954—marking will be made mandatory. The marking specification will automatically become a part of the procurement contracts of the Army, Navy and Air Force.

To Avoid Waste—The move is part of a broad campaign by the armed services to reduce wastage of critical materials. While no definite data are available, a Defense spokesman estimates conservatively that lack of a uniform marking system is costing the armed services — and hence the taxpayers—millions of dollars a year. This is because expensive alloy shapes whose composition cannot be identified without costly laboratory work go into scrap.

While the larger airframe producers in most cases have color marking systems of their own, there is no uniformity in these codes so that material marked at one plant is not readily identified at another plant. Thousands of subcontractors and suppliers have no marking systems whatever.

Just Starting — Much detail of the forthcoming marking system remains to be determined. As far as possible, the alloy products are to be inked or stenciled with the appropriate SAE, AISI or other number, with the brand or name of the producer, the size, heat number, character of heat or other treatment. There will be some use of color. The big objective is a single, uniform code whereby the markings will have the same significance in any warehouse or consuming plant anywhere in the country. The marking is to be done by the last processor of the material prior to shipment to consuming plant or warehouse.

A decision of basic importance to the producers of the alloy products is to abandon the use of gage numbers to indicate size. Thickness of sheets and strip, and diameter of wire and tubing will be shown in inches and fractions of an inch — as with bars, plates, shapes, etc.

In Favor—A survey recently conducted by the Air Force revealed that substantially all consumers desire a uniform marking system for alloy steels and nonferrous alloys. Warehouses were noncommital. Producers indicated a desire to consider the matter further before coming to a decision.

The Air Force survey gives indefinite expressions as to the cost of marking. Steel producers' estimates varied from a few cents a ton to 1.5 cents per pound. Consumers and warehouses reported that it now costs them all the way from $2 to $10 a ton to paint and otherwise mark alloy steels and keep them segregated by the various specifications.

New Manganese Supply

African deposit of high-grade manganese ore may yield 50 million tons

A NEW SOURCE of manganese in French Equatorial Africa contains as much as 50 million tons of ore.

A French firm, in which U. S. Steel Corp. has a 49 per cent interest, discovered the deposit, lying about 250 miles inland in the southern Equatorial area. French sources say the ore compares favorably with high-grade Russian ores. Several years will be required for exploration and development before open pit mining can begin.

Satisfactory Imports—American steel manufacturers, largely dependent on foreign manganese, have been getting enough to satisfy their needs—currently 1.8 million tons a year. Before the war Russia was the principal source of supply, but since 1950 Russian shipments have dropped sharply.

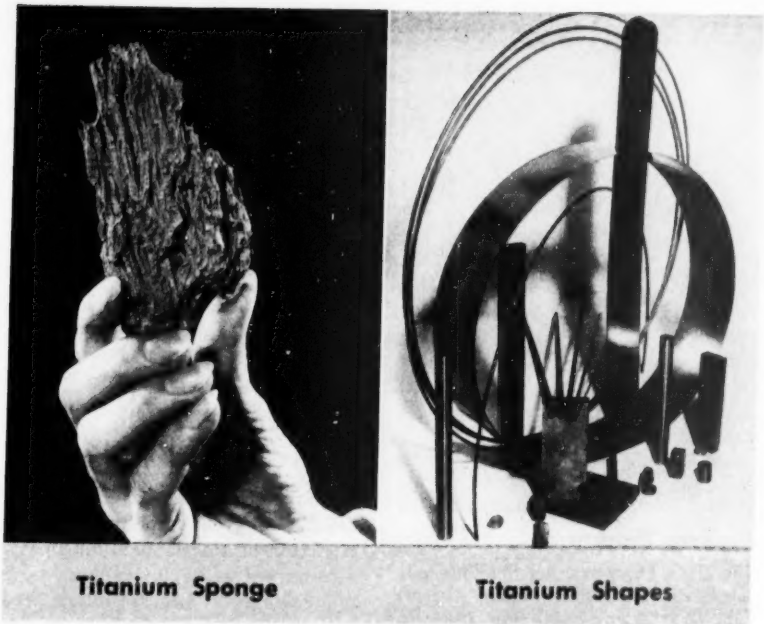
In the last two years, as Russian exports to the U. S. disappeared entirely, America has received manganese ore from Brazil, the African Gold Coast, India, South Africa and South America.

Critical Supply—Although persistent attempts are made to develop domestic manganese production, America still depends on imports to supply the vital steelmaking ore.

U.S. Buys Mexican Manganese

The U. S. has agreed to purchase 133,500 tons of Mexican manganese to be delivered in about three years for later processing to meet the needs of the steel industry, says Defense Materials Procurement Agency. With these purchase contracts, DMPA attains its program goal of 550,000 tons of Mexican manganese, and no further contracts are scheduled to help stimulate production of the metal in Mexico.

Contracts for the 133,500 tons of manganese were placed with Elmer Perry, Los Angeles; Impulsora Minera, Mexico City; Associated Metals & Minerals Corp., New York; Cia. Minera Anahuac, S. A., Mexico City, and Minas Consolidadas, S.A., El Paso, Tex.



Titanium Sponge — Titanium Shapes

Westinghouse

Aircraft Could Use 21,000 Tons Yearly

Titanic Titanium: More Needed

THE AIRCRAFT INDUSTRY can use 565 per cent more titanium than it is consuming now.

As major users of the middleweight metal, airframe makers are currently taking about 1250 tons of commercially pure titanium and 1900 tons of titanium alloys yearly. Assuming an annual procurement program of 100 million pounds of airframe weight, they estimate they could eventually use 2200 tons of commercially pure titanium and 18,750 tons of titanium alloys yearly, according to a report by Boeing Airplane Co. prepared for Aircraft Industries Association of America Inc.

If and When—The day when the aircraft industry will take as much as 21,000 tons of titanium and its alloys will be determined when technical problems are solved, when the price comes down and when enough capacity to produce sponge titanium and finished shapes is built.

Some 40 laboratories throughout the country today are working on technical problems involving titanium. The major need is for more satisfactory alloys. Closely related to research is the possibility of a drop in titanium's price. Once the cost was $20 a pound for refined sponge titanium. Now it's about $5 a pound, but should go still lower as science discovers more efficient refining and production methods.

Toward Solution — The third problem, of capacity, appears on the road to solution. Production of the sponge material will reach only about 3400 tons in 1953 but is expected to rise to about 18,600 tons annually by 1956. Capacity to produce finished titanium products now is above the current output of sponge titanium.

At present the two largest producers of titanium sponge are E. I. du Pont de Nemours & Co. Inc. and Titanium Metals Corp., the latter jointly owned by Allegheny Ludlum Steel Corp. and National Lead Co. A third sponge producer, Crane Co., is now turning out only small quantities, but it has a good chance to win government help to build a plant near Nashville, Tenn., which will be operated by a subsidiary, Cramet Inc., to produce 6000 tons of sponge a year. Odds are also good that Titanium Metals will be able to expand its sponge plant at Henderson, Nev. Du Pont has already begun expansion of its sponge titanium facilities in Delaware. There's likewise the possibility that a fourth firm, Monsanto Chemical Co., will enter the field, but that plan is still up in the air.

For the Future—Not so desperately needed is capacity to convert titanium sponge to finished products—yet. Firms that are in this end of titanium include Allegheny Ludlum; Rem-Cru Titanium Inc., formed by Crucible Steel Co. of America and Du Pont's Remington Arms Co. Inc.; Republic Steel Corp.; and Mallory-Sharon Titanium Corp., formed by P. R. Mallory & Co. Inc. and Sharon Steel Corp.

Aircraft companies want most of their commercially pure titanium now and in the future in the form of sheet. The greatest potential future use of titanium alloys in aircraft is in structural applications, and the forms required include sheet, forgings, extrusions, tubing, plates and bars.

Other Uses—While aircraft needs account for some 90 per cent of present titanium production, other uses are developing, notably for base plates for 81-mm mortars, field gun mounts and muzzle shields, recoil cylinders, armor plate and extruded parts for small arms.

Still other nonaircraft applications will turn up, but airframe companies promise to be the biggest buyers for years to come. As Boeing says, "The aircraft industry has arrived at the point at which the inadequacy of present structural materials is the critical factor limiting performance of aircraft now in the design stages." More and more it looks like titanium will solve that inadequacy.

New Rolling Mill Tested

Lone Star Steel Co. says it has performed a successful trial run of its rolling mill at the company's facilities near Lone Star, Tex. The mill will start to operate full-time when adjustments are completed.

Robot Elevators

Going up are sales of operatorless elevators. They're a "natural," says Otis Elevator Co.

OPERATORLESS elevator sales are ascending with dizzying speed as electronic engineers apply their wizardry to mass movement of modern cliff-dwellers.

Otis Elevator Co., New York, celebrating its 100th anniversary in 1953, expects automatic units this year to account for 80 per cent of its entire office building elevator sales. That's a far cry from the 12 per cent rung up in 1950 when the first automatic was installed in the Atlantic Refining Co. building in Dallas. The following year sales in this category catapulted to 32 per cent, and in 1952 to 58 per cent of office building jobs.

A Natural—To date Otis has sold 314 automatics in 86 new buildings and has contracted to change over 87 units in 20 existing buildings. Units can be used in buildings up to 25 floors high and at speeds up to 1400 feet per minute.

"Spontaneous acceptance of pilotless automatics is natural," says L. A. Peterson, Otis president, "because they represent one of the few things that counter the trend of rapidly rising costs of operation."

"Autotronic" — Features of the "Autotronic" elevator outlined by William H. Bruns, supervisor of engineering research, include automatic load weighing device, interlocking floor service system that prevents bypassing of lower floors during rush hours, electronic "Touch Button" car signal that actuates circuits through relays and replaces memory-type switches, intercommunication system between cars and starter's location and intermittent controls that shut elevators automatically when they are not needed and bring them back into service when traffic requires. At the same time operating cost — both by decreasing personnel and power consumption — is cut, transport time is minimized, traffic handling capacity increased and safety maintained.

Power Package

The U. S. Navy is using this little gas turbine developed by Solar Aircraft Co., San Diego, Calif., for powering shipboard fire-fighting pumps, while the Air Force is using it for aircraft auxiliary generator sets. It packs 50 horsepower in its two-foot cube package, runs on diesel oil or gasoline and weighs less than 100 pounds

Disaster Advice Given

Do you have a program for treatment of injured employees and quick resumption of production in the event of an air attack or another large-scale disaster? Hard-earned advice on disaster preparation is given by Norton Co., Worcester, Mass., whose $6-million precision grinding machine plant stood in the direct path of the New England tornado of June 6. The wind, in a matter of seconds, tore off 80 per cent of the plant's roof, removed most of the glass and transient siding and turned the cafeteria into a "pile of rubble."

Norton advises:

1. Have your emergency plan administered by an adequate number of supervisors and guards. Select your emergency supervisors for leadership, their working hours and the location of their homes.

2. Obtain sufficient emergency equipment, such as stretchers, chain saws, arm bands, rope, portable 1000-watt generators, etc.

3. Obtain portable radio equipment for communication.

4. Construct a well-protected command post with communications equipment, files of vital records and charts of the plant area.

5. A single person, usually the plant engineer, should be in charge of the entire disaster operation.

6. Designate key personnel on duty at all times who know how and where to shut off gas, electricity and steam lines.

7. Be prepared to feed voluntary workers.

8. Keep customers in other parts of the U. S. correctly informed as to actual damage; wire-service reports are sometimes exaggerated.

Construction Authority Asked

The Department of Defense is asking Congress to permit the construction of 169 new building projects valued at $529.4 million, with approximately $287.6 million for the Air Force, $145.6 million for the Army and $96.1 million for the Navy.

Defense chiefs say that they won't request any additional funds for the projects, but will use unobligated funds already appropriated to the armed forces for construction. The department is planning to submit a list of previously authorized building projects and ask that they be canceled to make way for the new programs. Cancellation of those items is expected to add more than $250 million to the funds available for military construction.

GE Pays Workers for Ideas

General Electric Co., Schenectady, N. Y., and its affiliates awarded a record $578,947 during 1952 for 27,432 useful suggestions from employees. The average award paid was $21.10. Since the program was established in 1922, GE has paid $4.3 million to employees for their suggestions.

CCC Gets Storage Bins

The Department of Agriculture says it has signed purchase contracts for 14,695 steel grain-storage structures, with a total capacity of 85.7 million bushels. Within the next two months, Commodity Credit Corp. will use the bins, which range in capacity from 3250 bushels to 44,396 bushels, for grain storage in the Midwest.

Chrysler

Deliveries will be slowed as . . .

Army Tank-Truck Program Hits a Detour

Spending for certain types of tanks and trucks will ease off from $160 million a month to $50 million a month. Detroiters are worried but there are no mass layoffs yet

TANGIBLE results of federal budget cuts appeared in the stretch-out of the Defense department's tank and truck program.

It will be a two-way operation: Spending for the M-48 and M-47 tanks, 2½-ton and 5-ton trucks and light and medium-tank engines will be reduced from the current rate of $160 million a month to $90 million a month by the spring of 1954 and then taper off rapidly to $50 million a month later in the spring; producers of each type of equipment will be narrowed down to one. The number of units to be built will not be cut; they'll just be delivered over a longer period.

Here's the box score:

M-48—Of three M-48 tank producers now in production, Ford Motor Co. is to be phased out by the end of 1953, leaving Chrysler Corp. at its Newark, Del., plant, and Fisher Body Division, General Motors Corp., at Grand Blanc, Mich., operating on reduced schedules. Chrysler and Fisher Body will then enter competitive bids to determine which will remain in production after the spring of 1954.

M-47—The two M-47 tank producers will phase out of production by the end of 1953, Chrysler's Detroit plant finishing up in November and American Locomotive Co. winding up by year end.

Engines — Continental Motors Corp. will remain in production of light and medium-tank engines, but similar production by Chrysler is to phase out by Apr. 1, 1954.

2½-Ton Trucks—Of three 2½-ton truck producers, Studebaker Corp. will be out of production by the end of 1953 and Reo Motors Inc. and Truck & Coach Division of General Motors will bid on which one will continue production after Jan. 1, 1954.

5-Ton Trucks—Three makers of 5-ton trucks will bid competitively to determine which one will continue production for the Army after January, 1954. They are Mack International Motor Truck Corp., International Harvester Co. and Diamond T Motor Car Co.

Unaffected are production schedules for the M-41 light tank at Cadillac Division of General Motors in Cleveland. But the T-43 heavy tank's only producer, Crysler, will finish its contract in the spring of 1954 and no new contracts are being considered.

Unanswered Questions — What will happen to facilities and employees eliminated from the tank and truck programs? While Detroiters are worried, local industry seems well able to absorb many of the displaced workers. Only a third of the 13,800 people idled at the Kaiser plant by cancellation of C-119 and C-123 plane contracts even applied for unemployment compensation. And want ads still plead for help.

Chrysler Corp. says that when the M-47 tank program ends next November at the government-owned Detroit plant some 900 workers will be laid off. Another 2800 workers will stay on for limited job shop work on spare parts. Brig. Gen. Carroll H. Deitrick, commander of the Army's Ordnance Tank-Automotive Center in Detroit, indicated this small volume work would be ended by next spring.

Army Secretary Robert Stevens said last week the Army will negotiate with companies whose plants are closing down on ways and means to maintain facilities and tools in the best possible stand-by condition. Secretary Stevens explained the moves as necessary because the Army has just about accumulated its necessary reserves of the affected items. "We hope the revised tank program won't mean a narrower mobilization base," he said.

Appointments in Washington

Samuel N. Comly, vice president and treasurer, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., was named assistant administrator, National Production Authority.

James S. Weatherby, research economist, Atlantic Refining Co., Philadelphia, was appointed chief, Domestic Petroleum Branch, Petroleum Administration for Defense.

Dr. Beatrice Aitchison, Washington, was designated director of transportation research, Bureau of Transportation, Post Office Department.

Guy Farmer, recently confirmed as a National Labor Relations Board member, was designated chairman of that body to succeed Paul M. Herzog.

Wilbur A. Dexheimer was appointed chief, Bureau of Reclamation, Department of Interior.

Leonard F. Erickson, vice president and director, McCann-Erickson Inc., advertising agency, New York, was appointed deputy administrator, International Information Administration, in charge of the International Broadcasting Service—the Voice of America.

Charles R. Burrows, State department foreign service career officer, was named director, Office of Middle American Affairs, Bureau of Inter-American Affairs.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

The public will have to be jabbed out of its indifference about water pollution. Congress is lethargic, and so are sales of waste treatment equipment

MAKERS of equipment for sewage and industrial waste treatment are getting one-third to one-fourth the business they should on the basis of need, according to statistics developed by the U. S. Public Health Service.

In the year ended June 30, 1953, their sales to municipalities came to $137 million—the lowest total for any year since World War II. Their sales to industrial companies, in the absence of statistics, are estimated at possibly the same dollar level. It is currently estimated that the sales potential, on the basis of need, is somewhere around $1 billion a year.

Adds to Living Costs—The lack of more business in this field, of course, is due to public indifference about the problem of water pollution. With taxes at the present high level, political officeholders hesitate to launch public works programs which would add to the present burdens on taxpayers. And yet, in one way and another, pollution adds to the taxpayers' cost of living. For example, because of pollution, manufacturing plants have to go to large expense in installing evaporators, centrifuges, chlorinators, pumps, instruments and much other equipment to convert water to their needs, and these costs necessarily add to the price of the product.

Pollution-wise authorities in Washington believe that the fight on pollution can be intensified only through an all out educational campaign to bring home to the average citizen just what pollution means to him and just what it is costing him. They believe that such a campaign, spearheaded by the sewage and industrial waste treatment equipment industry, would bring big dividends in a bigger and more sustained volume of business. As examples, they point to what has been done to sell the public on the benefits of citrus fruits and Miami's shores, and to what now is being done at the recommendation of Secretary of Agriculture Benson to promote the sale of milk.

Less Attention—In some ways, water pollution must be a federal problem, because it involves upstream and interstate pollution problems. The industry concerned certainly has not gained by failing to inform Congress adequately—for the measure of congressional interest is seen in the dollar appropriations, and the trend here is sharply downward.

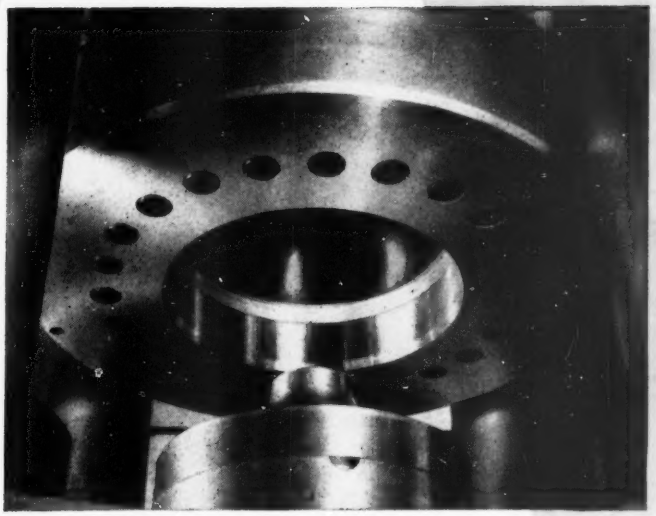
In fiscal 1953 the Public Health Service was given $1.3 million for its water pollution research activities and its planning and other missionary work with the states and municipalities; and nothing whatever was allowed for dollar grants to the states and municipalities. On the basis of the Senate-House conference agreement, it will get considerably less than $1 million for water pollution work in fiscal 1954, with no authority for making grants. In anticipation, the Health Service already has cut its pollution staff.

Trade Curbs Upheld . . .

Proponents of so-called "fair trade" curbs scored a victory when the United States Court of Appeals for the Fifth Circuit upheld the constitutionality of the Louisiana Fair Trade Law and the McGuire Act. The case arose from refusal of a Louisiana distributor to sell Eli Lilly pharmaceutical products at established fair trade prices. The distributor contemplates carrying the question to the Supreme Court.

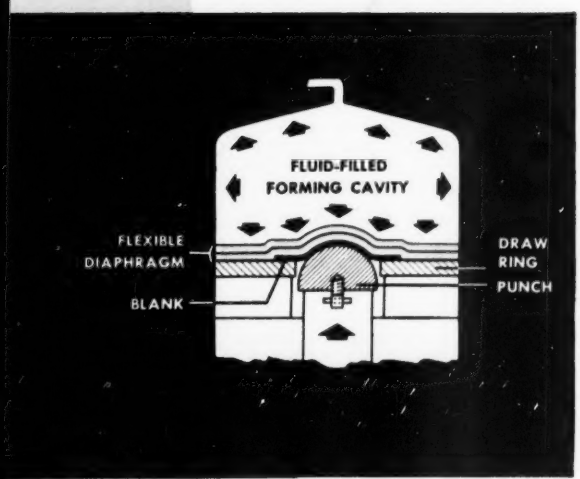
Extending Amortization . . .

Under S. 2306, introduced by Senator Capehart (Rep., Ind.), and now before the Senate Finance Committee, 5-year tax amortization—at present confined to defense facilities—would be applied universally to all capital investments acquired after Dec. 31, 1953. Senator Capehart believes, from the experience gained under rapid amortization in the defense program, that his measure would serve to encourage industrial expansion generally and thus help business and employment. He believes also that it would assist new enterprises to retain a larger portion of their profits during the formative years of operation. He explains that he has introduced the bill at this time in order to allow plenty of time for studying the complicated subject of amortization.



Deep Squeezer*

OF COLD DRAWN PARTS... THE HEART OF THE Hydroform



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Sheet metal parts are literally squeezed into shape by this built-in feature of the Cincinnati Hydroform. It is a fluid-filled forming cavity sealed by a flexible diaphragm to which wear pads are cemented to reduce wear. The flexible die member takes the place of more than half the parts of a conventional draw die.

DIAPHRAGM LIFE

Diaphragm life is dependent upon part shape, depth of draw, and type and thickness of the material being drawn. Life can range up to 15,000 or more pieces. Prompt replacement of the wear pad when worn will prolong flexible diaphragm life.

The diaphragm is held in the forming cavity with a simple snap ring and can be changed in less than 30 minutes.

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Tool and operation savings far outweigh the relatively low cost of flexible diaphragms. No maintenance of the diaphragm is required other than occasional changing of the wear pad.

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Tool costs are greatly reduced; fewer operations are required; part quality is materially improved ... these are but a few of the important advantages of this simplified deep drawing process. Let a Cincinnati Milling field engineer give you complete information. Write for Bulletin M-1759-2.

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THE CINCINNATI MILLING MACHINE CO.
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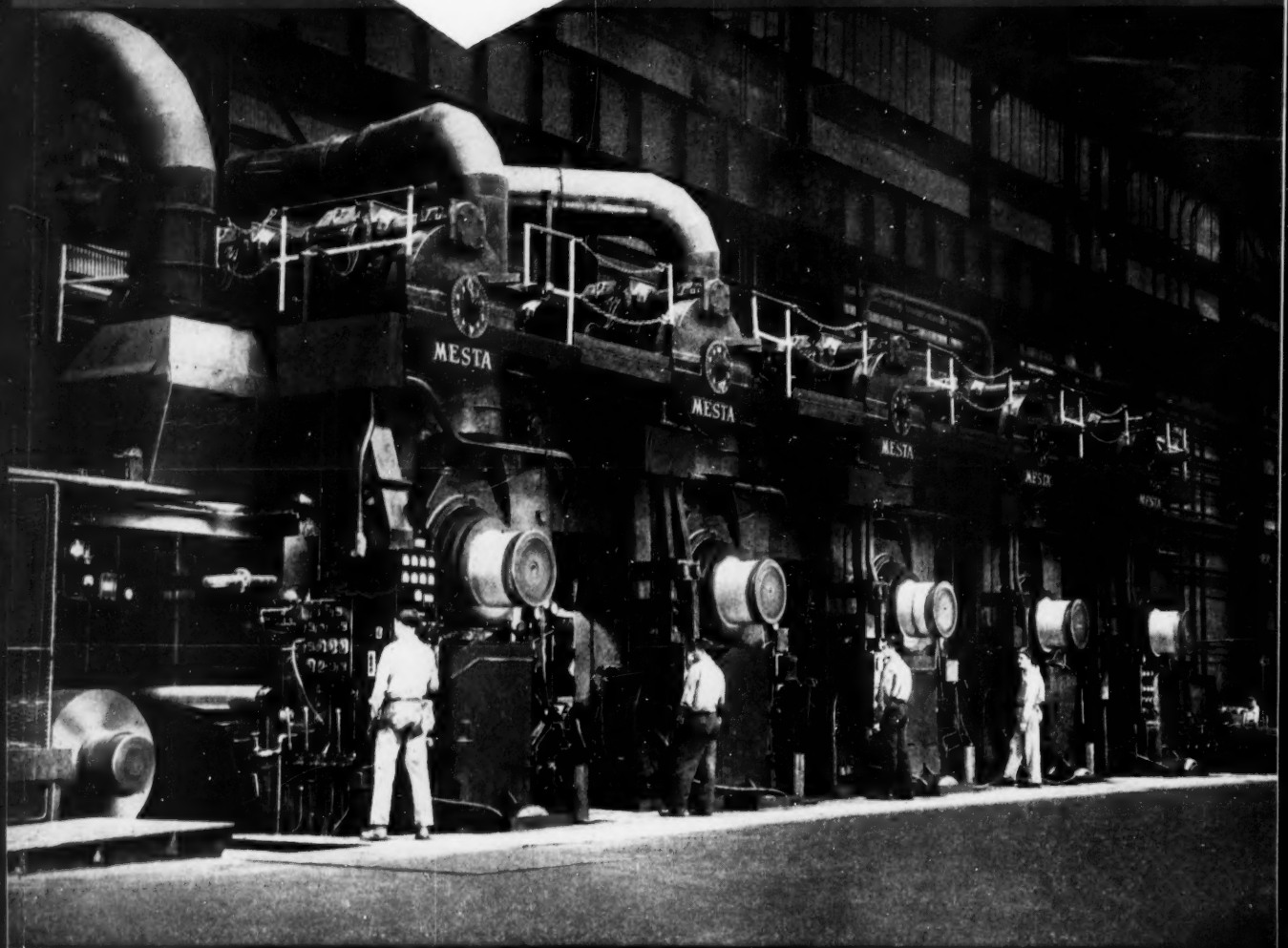
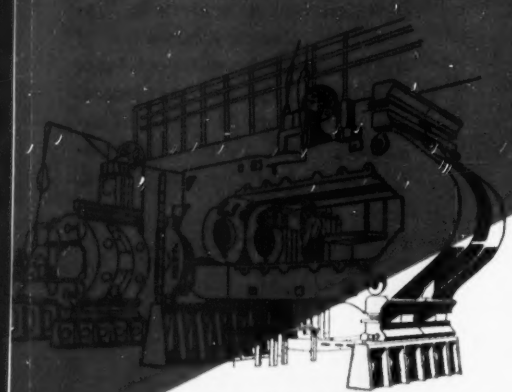
MESTA

HIGH-SPEED COLD MILLS



MESTA 56" FOUR-HIGH, FIVE-STAND HIGH-SPEED TANDEM COLD MILL INSTALLED IN A LARGE EASTERN STEEL PLANT.



SIMULTANEOUSLY MACHINING ROLLING MILL HOUSINGS IN PAIRS ON MESTA HEAVY DUTY DRAW-CUT SHAPERS

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

Foreigners Buy More Capital Goods

Export sales of capital goods are increasing faster than total U. S. exports. Overseas outlets are assuming critical 1-out-of-4 proportions in many U. S. capital goods producers' sales

CAPITAL GOODS producers are spearheading U. S. efforts at foreign salesmanship.

Last year, the $3 billion machinery and equipment exports accounted for 20 per cent of the U. S. total and almost 25 per cent of all nonmilitary U. S. exports. That's a healthy increase over capital goods' prewar average of 15 per cent of total exports.

Important Item—Selling to export markets has growing significance for capital goods makers, too. In 1952 foreign sales rang up 11 cents of the total sales dollar of such manufacturers; physical volume bulked three - and - one - half times greater than in 1938; dollar value inflated to six times the 1938 size.

Lump-sum averages don't necessarily show the critical proportions export sales have assumed for many U. S. capital equipment firms. A recent survey by the Council for Technological Advancement of 248 Machinery & Allied Products Institute member companies indicated that foreign business accounted for over 15 per cent of total business in 33 firms and for 25 per cent or more in 11 firms.

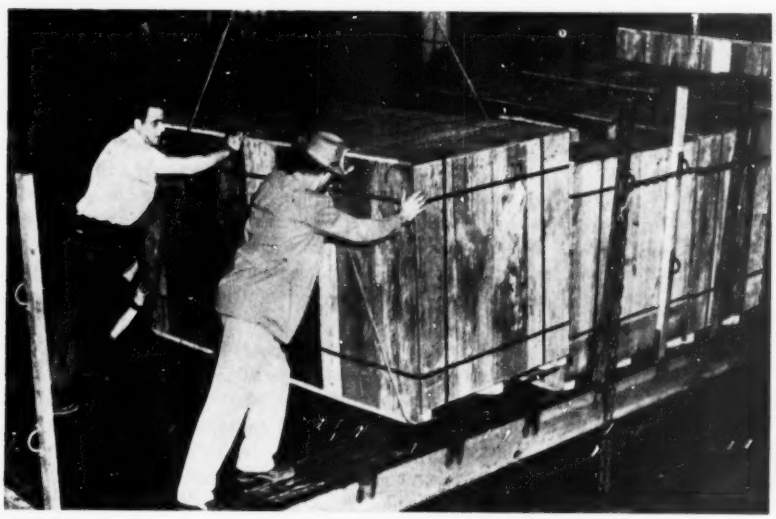
Where To?—The kaleidoscopic effects of U. S. foreign aid, grants and donations on foreign trade patterns have cleared somewhat, revealing Latin America as the U. S.'s largest overseas capital goods customer, displacing the prewar champion, Europe, which has been bumped into third position. Up-and-coming Canada now ranks as number two best customer.

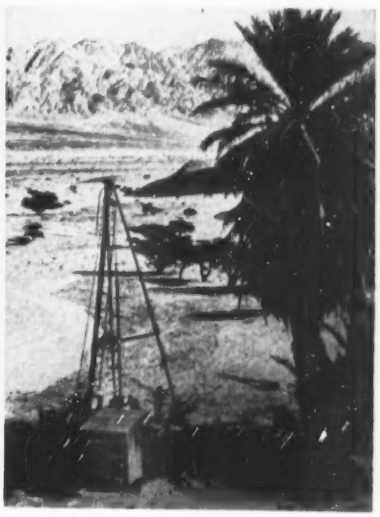
First quarter, 1953, export figures show not all capital goods are doing equally well in foreign markets. Total machinery and equipment annual sales rate slipped 1.8 per cent in first quarter, 1953, from the like 1952 quarter—$3047 million compared with $3101 million—despite a 27 per cent increase in foreign purchases of electrical machinery and apparatus. Metalworking machinery (machine tools, rolling mill and foundry equipment, metalworking presses, portable tools, miscellaneous tools, parts and accessories) gained 26 per cent —$320.4 million over $254.8 million—but construction, mining and pumping equipment lost 8 per cent —$489.2 million from $531.2 million—and office machines and parts dropped 20 per cent—$82 million from $102 million.

Renewed Interest—The increased rate of capital goods exports points up a surge of plant expansion and re-equipment among South American, Canadian and European manufacturers which parallels that which has taken place in this country. Until recently too busy with domestic business, capital goods firms are now turning with renewed interest to these offshore markets.

South Africa Ups Steelmaking

Iscor and other steel producers in South Africa are making rapid expansion strides. During fiscal 1953, 1.3 million tons of steel products from domestic and overseas sources went to South African manufacturers. Iscor itself has built its capacity to almost 1.2 million tons a year and has plans for further expansions which will add another 100,000 tons. Output in the fiscal year just ended amounted to 1,051,000 tons compared with 694,000 tons during the preceding year.

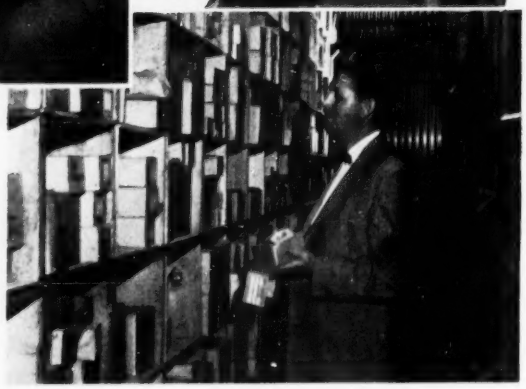




Water for Israel Via American-Made Machinery

American machinery helps win back desert as farm land in Israel. Large centrifugal pumps made by De Laval Steam Turbine Co., Trenton, N.J., will feed about 41 million gallons of water per day into a system of reservoirs and concrete pipe when the installation is complete. At left a De Laval pump starts on the first leg of the journey to Israel. Deep-drill wells are probed, at right, in the Negev desert. The system will contain some 10 miles of pipe

Aer-O-Cratt partners map sales strategy. Left to right: Ralph Milner, electronic sales head; Charles Osborne, finances and taxes; and Lou Boyd, aircraft hardware sales manager



No stranger to what it takes to make aircraft fly is Lou Boyd. Above he displays a valve unit, one of the 4000 items handled by the company. Below, he checks warehouse inventory before promising quick delivery to one of Aer-O-Craft's customers

Aircraft Hardware

Selling Is 90% Service

Lou Boyd of Aer-O-Craft helps make the planes fly by finding what manufacturers need and building or finding it for them

IT IS 9:05 a.m. in Baltimore. Joe Harris, purchasing agent for Acme Aircraft, has just finished sorting the morning mail as the telephone rings. "Los Angeles calling."

A moment later: "This is Lou Boyd of Aer-O-Craft. We can ship those aviation machine screws in stainless Thursday from Rockford, Ill. O. K.?"

As the conversation continues, Harris begins to think about the time differential between Baltimore and Los Angeles. "Good heavens, man, what time is it out there?"

"About 6 o'clock," replies Boyd.

East Served Early—Six o'clock calls to eastern aircraft contractors and other buyers of aircraft hardware, are a habit with Lou Boyd.

"I reach them early in their working day, which I find is a good time to make sales. Generally, they are a little impressed when they realize what time it is out here. Then I am free to devote my time to local buyers when the working day starts here."

He Went West—Boyd is partner in charge of hardware sales for Aer-O-Craft, Van Nuys, Calif., manufacturer and distributor of aircraft hardware, hydraulic fittings, electronics, instruments, accessories and other equipment.

Youngish (37) and personable, he is called a natural sales manager by his partners. He received his early training in selling automotive hardware, and before and just after World War II was sales manager for the Kimball Co. of Cleveland. While in military service he became enamored with the West Coast and soon after the war joined Aer-O-Line, one of the larger aircraft hardware companies, as sales manager.

As the aircraft industry started its post-Korea boom, Boyd saw the possibilities in supplying hardware and fittings to the 60,000 companies involved in the program. He talked the proposition over with Charles Osborne and Ralph Milner, two associates at Aer-O-Line. They formed a partnership and went into business for themselves. Osborne is a former comptroller for the state of Pennsylvania and during the past 10 years served as general manager for several aircraft hardware companies. Milner, a former Marine Corps pilot, was sales engineer for companies producing electronic equipment for aircraft.

In Aer-O-Craft, Osborne manages the office and handles finances and taxes. Milner handles sales for

the electronics and components end of the business. Boyd handles hardware sales.

Easier in West—"It is a lot easier to get started in business for yourself out here than it is in the East," Boyd told a STEEL reporter accompanying him on a day's round of calls.

"We had pretty good financing when we started. Our bank arranged adequate credit without batting an eye.

"Then your trade relationships are all newer on the West Coast. There are fewer people buying from suppliers through habit. Look at all those little shops over there. Most of them have been established within the last year or two and they are all busy."

But It's Competitive — "Don't think that getting orders is too easy. Competition out here is just as keen as it is in the East.

"But the potential in aircraft hardware and the other items we produce and distribute is terrific. The aircraft manufacturing program this year will hit $12 billion. And that doesn't include the maintenance work by the airlines, a substantial share of our market."

International—Aer-O-Craft does an international business. Most foreign airlines maintain purchasing offices in this country and many are located on the West Coast. It is possible to do a substantial foreign business without leaving Los Angeles. Canadian, Mexican, Chinese, Israeli and Philippine airlines buy from Aer-O-Craft.

Airlines, incidentally, account for about 20 per cent of aircraft hardware and equipment sales for their maintenance work. The remaining 80 per cent, Boyd figures, is about evenly divided between the prime manufacturers and subcontractors and suppliers.

"Actually, our business is about 90 per cent service," says Boyd. "We find out what a manufacturer needs and then we either make it for him or find someone who can."

●

This is the seventh in a series on what various types of executives do in a typical day. For others, See STEEL, Apr. 14, 1952, on a purchasing agent; June 9, 1952, on a vice president; Aug. 18, 1952 on a president; Nov. 10, 1952 on an inventor-engineer; Feb. 9, 1953, on a market research manager; and Apr. 13, 1953, on a metallurgist.

Management Pays as Workers Play

Industry will invest $800 million this year on social, recreational and cultural activities for workers. Is this money being spent wisely?

Chrysler

VIRILE MFG. CO. has a problem. Virile management invested $75,000 this year in building baseball grounds for the company team to use. Now the grounds are crowded once a week by nonpaying spectators, but the turnover rate at Virile is increasing, not dropping. "Why don't they stay with us?" Virile asks.

Resentment—Companies such as Cleveland Graphite Bronze Co., Cleveland, can answer that question. "Company athletics help build team spirit but shouldn't be placed on a handout basis," Cleveland Graphite's recreation directors say.

At the Cleveland company, workers interested in athletics join employee-organized clubs to which they pay dues. Employees draw up their own athletic budgets and management pays half the expense. Out of 3000 workers, 1900 belong to an athletic club.

Growing Bigger — Company-sponsored recreation is big business now. The National Industrial Recreation Association estimates that 30,000 manufacturing firms will spend $800 million on recreational (social, cultural and athletic) activities in 1953. This is more than double the amount spent in 1948 for the same purposes.

No one should invest $800 million without analyzing the dividends, as NIRA points out. W. T. Prichard, former president of NIRA, illustrates dangers of forcing a recreation program on employees. "To be successful, an industry recreation program must be company-generated but employee-directed."

Workers' Program—Still more conservative is Lincoln Electric Co., Cleveland, where employees generate their own activities and pay most expenses. About 200 of 950 workers participate in Lincoln's three sports—golf, bowling and lawn bowling. "If enjoyment is the goal, our recreation plan is succeeding," Lincoln officials say. "Our workers realize that large expenses on athletic equipment simply detract from the company budget, providing less money for salary payments."

Such firms as SKF Industries Inc., Philadelphia, plan larger programs with such objectives as providing opportunities for workers to show leadership qualities. Metalworking firms can also gain favorable publicity through programs similar to SKF's choral group which appears before various Philadelphia organizations.

Large Projects—Big corporations such as General Motors Corp. and Chrysler Corp., Detroit, and Thompson Products Inc., Cleveland, sponsor heavy athletic programs to provide team spirit among a large number of workers.

Despite management's good intentions, many companies instituting impressive recreational programs find their plans are not succeeding. A large Illinois manufacturer planned a picnic for 2500 workers. When 4000 appeared, food ran short and the sponsor was blamed for the failure.

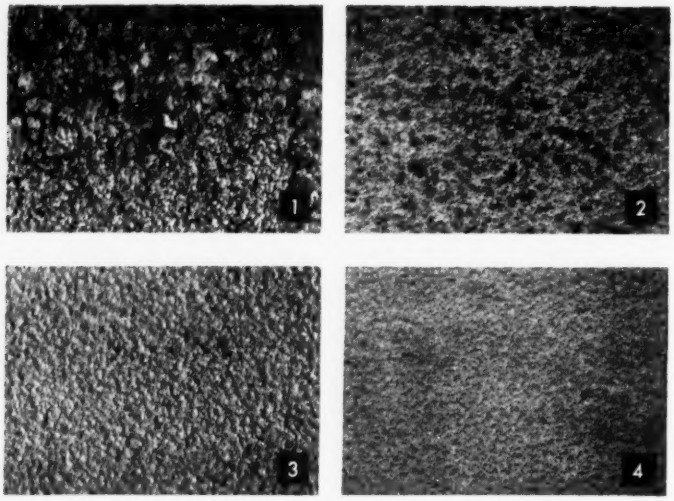
Sound Planning — Firms with successful recreational programs say the solution is to approach such projects very carefully, and in case of doubt—let the workers decide what they want.

Specify

N-A-X
HIGH-TENSILE STEEL

for

Longer Life through Corrosion Resistance



Photographs show effects of atmospheric corrosion after six years' exposure of unprotected surfaces.

1. Low carbon sheet steel showing friable heavy rust.
2. Low carbon sheet steel with rust removed showing heavy pitting.
3. N-A-X HIGH-TENSILE sheet steel showing tightly adhering rust.
4. N-A-X HIGH-TENSILE sheet steel with rust removed showing absence of excessive pitting.

Low carbon sheet steel lost four times more weight than N-A-X HIGH-TENSILE in six-year test. With increased time this ratio becomes greater.

N-A-X HIGH-TENSILE, having 50% greater strength than mild carbon steel, permits the use of thinner sections—resulting in lighter weight of products. It is a low-alloy steel—possessing much greater resistance to corrosion than mild carbon steel, with either painted or unpainted surfaces. Combined with this characteristic, it has high fatigue and toughness values at normal and sub-zero temperatures and the abrasion resistance of a medium high carbon steel—resulting in longer life of products.

N-A-X HIGH-TENSILE, with its higher physical properties, can be readily formed into the most difficult stamped shapes, and its response to welding, by any method, is excellent.

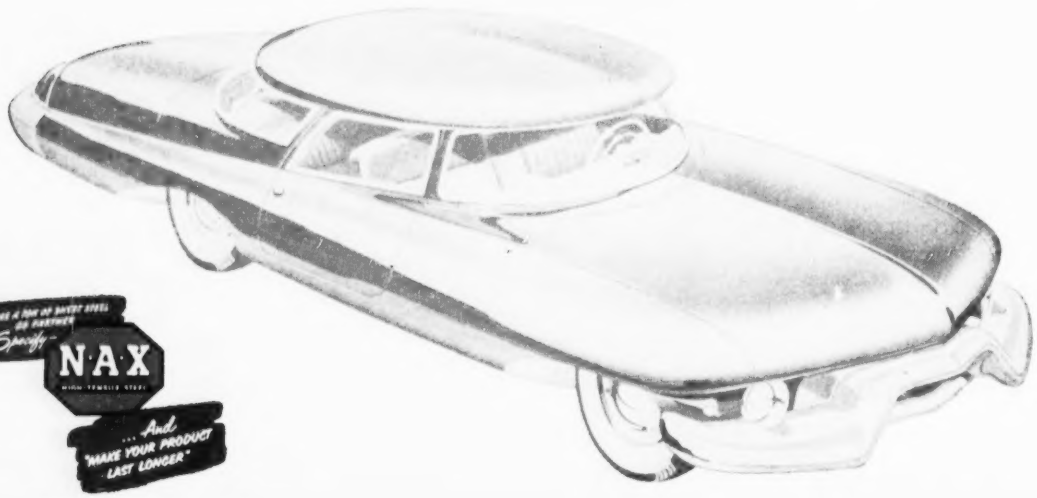
Due to its inherently fine grain and higher hardness, it can be ground and polished to a high degree of lustre at lower cost than can mild carbon steel.

Your product can be made lighter in weight . . . to last longer . . . and in some cases be manufactured more economically, when made of N-A-X HIGH-TENSILE steel.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — **Ecorse, Detroit 29, Michigan**

NATIONAL STEEL CORPORATION



KEEP YOUR SCRAP MOVING TO YOUR DEALER

By FLOYD G. LAWRENCE *Detroit Editor*

Mirrors of Motordom

Evolution and economics have led to the fact that wheel covers are taking over on auto wheels today. One company, Lyon Inc., produces nearly all the covers used

DETROIT

AN AUTOMOBILE WHEEL has all the earmarks of an uninteresting object. Its shape is prosaic, its behavior monotonous and it's usually dirty. Yet perhaps it is this very dullness of wheels in general that makes them one of the most enticing spots to add a touch of glamour to the family bus.

As early as Feb. 5, 1931, this column reported: "Budd Wheel, which is working on all-steel bodies for Chrysler and Dodge, has designed chrome-nickel corrosion-resistant steel veneer spokes for Ford wheels. These are in the nature of accessories and may be applied by owners."

In 1937, this column reported: "There is a definite trend toward more decorative wheels for this year. Hub caps will be larger, practically eliminating or concealing spokes."

Frenzied Adornment—But today we are living in an eclipsing era of wheel adornment frenzy. Some sport the all-revealing spokes, others the all-concealing covers; while fast vanishing from the American scene is the middle-of-the-road unadorned disc wheel. Still small in number are the wire wheels, but the wheel cover is taking over on cars produced today. (See chart). In most cases the covers are no longer listed as optional equipment on virtually all of the remaining models.

It is fairly obvious that these platters are not offered as an aid to the motorist with a flat tire. No doubt many an unfortunate, painstakingly working one of the wheel covers off with a screw driver or reapplying it using the heel of his hand as a mallet, has wondered just how the wheel cover happened to come into vogue. The answer is evolution and economics as usual.

Just Grew—As the disc wheel gained momentum in the industry in the 1930's, hub caps grew larger to "doll up" the cars. Working from the outer edge of the wheel, the trim ring came into being. These narrow chromed rings press into the rim of the wheel and though they started life only an inch wide, they gradually increased to 4 inches or more in width. At this point they became known as donuts and they met the hub cap creating much the effect the wheel cover gives today.

You've already guessed the next step. About 1948 it was decided to do away with four pound hub caps and the waste material lost from the stamped hole in the donut by making both in one unit—the wheel cover.

Economy—As produced today a wheel cover weighs only about 1¼ pounds. It permits the auto companies to eliminate the five spring-clips and rivets per wheel formerly used to hold the hub cap on the wheel—25 per car. But perhaps most important of all, since the very edge of the rim is all that shows, in many plants the wheels are supplied painted a very few standard colors and the laborious scheduling of wheel colors to match the bodies going down assembly lines is eliminated. One auto company adopted the wheel covers primarily because it didn't have enough room in one of its plants to retain the wheel paint line.

Using wheel covers is even less expensive today than it was a few years ago as the volume grows. Sales have jumped from $10,379,000 in 1946 to a probable $23 million this year, and next year should be even better.

Company Story—Perhaps you're thinking this is the story of a new industry. Actually it is the story of the one company which produces virtually all of the wheel covers used by the auto industry today, Lyon Inc., Detroit. Out at the Lyon plant on West Chicago boulevard, presses stamp the wheel covers out of 430 stainless .018-.020 inch thick at the rate of 12-16 strokes per minute. The metal is fed directly from coils into the machines and the covers flow from one machine to the next for the three, four or five draws necessary to produce the finished part.

The covers are then transferred to automatic polishing and buffing machines and then the medalion

CARS USING WHEEL COVERS

Chevrolet	30%
Pontiac	75-80%
Oldsmobile	80-90%
Buick	100%
Cadillac	100%
Plymouth	85%
Dodge	90%
De Soto	100%
Chrysler	100%
Ford	30%
Mercury	100%
Lincoln	100%
Hudson	15%
Kaiser	100%
Nash	75%
Packard	60-75%
Studebaker	60%
Willys	40%

Source: Lyon Inc. (estimated)

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embossed on the cover is painted. A quick dry and the wheel covers are packed and ready for shipment to be opened on almost every final assembly line in the country today. Wheel covers, indeed, are covering the wheels.

Car of the Week

If Pontiac had conducted a contest it couldn't have found a better symbol for its product than an Indian. The formula that keeps Pontiac in fifth place saleswise is plenty of chrome warpaint coupled with the reliability of Sitting Bull.

In comparison with other makes, the Pontiac is not a hot automobile. Acceleration both in traffic and on the open road is perhaps slightly above average, handling likewise and cornering ditto. Visibility, too, is probably about average, though the high hoodline obscures the right front fender.

But the Pontiac is a comfortable automobile to ride in and easy to enter and leave. Interiors are lavishly appointed for a medium priced car and, in the Chieftain model tested, workmanship both inside and out was top flight. Instruments are well grouped and night illumination is excellent. Wind wander and float are absent on normal roads at speeds up to about 75 mph. Passing kickdown on the Hydramatic was necessary and did its job adequately.

All in all, the Pontiac combines what many consider to be a really glamorous appearance with solid mechanical underpinnings that do much to justify the slogan, "Dollar for dollar you can't beat a Pontiac."

Exhaust Notes

Currently in advanced stages of experimentation by one of the Big Three is an alternating - current electrical system for passenger cars. Utilizing a generator about 12 inches long and eight inches in diameter, the system feeds into a group of transformers and rectifiers to give varying voltages and dc current required for various units. Thus an air conditioner, for example, could be powered by a 45-volt electric motor in one integral unit rather than driving the compressor from the motor as is now required. Lights could remain six-volt, giving better life and more accurate focus due to the thicker filaments, while the ignition coil could receive any requisite quantity of current in the primary for the desired spark intensity. Keep an eye on this development, for it seems likely the car of the near future will contain its own generating station.

Remember the mechanical power steering unit announced by Studebaker the first of the year? Engineers found the Borg-Warner unit satisfactory in preliminary tests, but when production was begun the units were noisy. Studebaker cars are currently equipped with Saginaw power steering of the hydraulic integral type but the Borg-Warner unit may be ready for production later this year.

British car output reached levels not attained since November, 1950, during April of this year. About 26,000 of the 44,000 cars produced during the month were exported.

And speaking of British cars, keep an eye on the new standard TR-2 sports car. Built by Standard Motor Co. Ltd., the job will hit 115 mph in touring trim and is expected to retail in the U. S. for about $1500.

Almost one-third of the auto industry's entire steel requirements will be made in its own backyard when expansion program of McLouth and Great Lakes Steel companies are completed by the end of 1954. Great Lakes' capacity will go to 3.5 million ingot tons and McLouth's to 1.1 million ingot tons annually.

Definitely being discouraged is competition use of the Chevrolet Corvette. Foreign sports car firms try to get their first models into the hands of well-known competition drivers to insure a racing reputation. The first model of the Corvette went to Harlow Curtice, the second to William Hufstader and about nine more are undergoing tests. The order of Bruce Cunningham for two was received coolly. This discouragement of competition use is particularly striking since Corvette means "Sloop of War."

Sponsored in Detroit by local Chevrolet dealers is a "Junk your Jallopy" campaign. Ostensibly to get unsafe automobiles off the street, the campaign also might have the effect of getting safe ones on. Watch for such campaigns to spread in the shining name of safety as used cars get harder to sell.

On the subject of safety, recent inspections by dealers throughout the country indicate that one out of every six cars tested had faulty brakes. How are yours?

Today's auto tire gives the motorist six times the mileage at twice the speed as the tire of 35 years ago and costs only half as much. The tire of a not-too-distant tomorrow will give safe rides at 100 mph and last the life of your car, says U. S. Rubber Co.

Visit an Auto Plant

If you're going to be anywhere near Detroit, a visit to an auto plant will prove to be a truly interesting and worthwhile experience for you and the entire family. All final assembly plants conduct the tours and are delighted to have visitors. With the exception of Studebaker at South Bend, Ind., and Nash at Kenosha, Wis., you can see a plant of your favorite make within two hours' driving of Detroit. Tours take only about an hour.

Auto, Truck Output

U. S. and Canada

	1953	1952
January	612,815	424,559
February	623,793	464,577
March	752,474	525,024
April	782,453	570,464
May	685,390	542,559
June	713,206	542,478
July		226,134
August		322,755
September		595,715
October		656,767
November		548,782
December		569,715
Total		5,989,509

Week Ended	1953	1952
June 13	166,832	130,574
June 20	169,031	129,353
June 27	173,702	124,370
July 4	140,491	86,052
July 11	168,040	70,592
July 18	173,000*	32,442

Sources: Ward's Automotive Reports
*Estimated by STEEL

From the experience of building

NEARLY 8,000,000 *Maytag* WASHERS

get the mo$t for your Zinc Die Ca$ting Dollar!

In building nearly 8 million washers since 1907, The Maytag Company has always maintained dependability through top quality. The Maytag Master model of the wringer-type machine, first built in 1939, has always utilized ZINC Die Cast operating components and those in the current model typify the advantages of this metal and method of production.

ECONOMICAL, TROUBLE-FREE ASSEMBLY

Examine these six ZINC Die Castings from the standpoint of complexity of shape and you will realize why, by any other means of manufacture, a greater number of parts would be required to serve the same purpose. An absolute minimum of machining is required to prepare these castings for assembly and their dimensional accuracy assures perfect fit every time.

STRENGTH AND BEAUTY

The unusual castability of ZINC Alloy permits section thickness to be varied in proportion to the stresses imposed. Thus, these castings are thick only at vital points, to provide maximum strength with a minimum amount of metal. From an appearance standpoint, the smooth as-cast surfaces of the ZINC Die Castings are economically finished with a beautiful baked white enamel.

In selecting a die casting alloy there are many factors—both physical and mechanical—to be considered in addition to the base price of the metal. Ask any commercial die caster about the advantages of ZINC Die Castings —or write to us.

The New Jersey Zinc Company, 160 Front St., New York 38, N. Y.

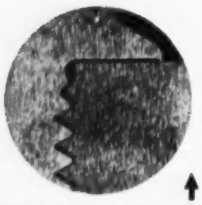
ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

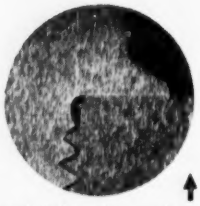
HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

Stronger!

Faster! Saves Money!



Teeth of SPIN-LOCK Screw touch bearing surface before final tightening.



Final tightening embeds teeth in surface, assuring positive locking.

That's the unique RB&W SPIN-LOCK Screw

This patented new screw rings the bell three times:

Stronger... SPIN-LOCK exerts *greater clamping force* because of its heat-treated strength. It *can't loosen* because its exclusive ratchet-like teeth lock into the surface, hold tighter than ordinary fasteners under vibration.

Faster... SPIN-LOCK needs *no washers*. It *drives easily and quickly*, even in hard-to-reach spots. *No special handling* is required—SPIN-LOCK screws can be hopper-fed.

Saves money... SPIN-LOCK's *one-piece construction* means there's just *one part to buy and stock*. Purchasing and inventory-taking move along faster, cost less. Faster assembly cuts costs. Hex, pan, truss, flat heads.

Write to Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y., for free booklet containing complete data and specifications on the SPIN-LOCK Screw.

RB&W—The Complete Quality Line. *Plants at:* Port Chester, N .Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. *Additional sales offices at:* Philadelphia, Pittsburgh, Detroit, Chicago, Dallas, San Francisco. *Sales agents:* Portland, Seattle. Distributors from coast to coast. B.3.2

RB&W

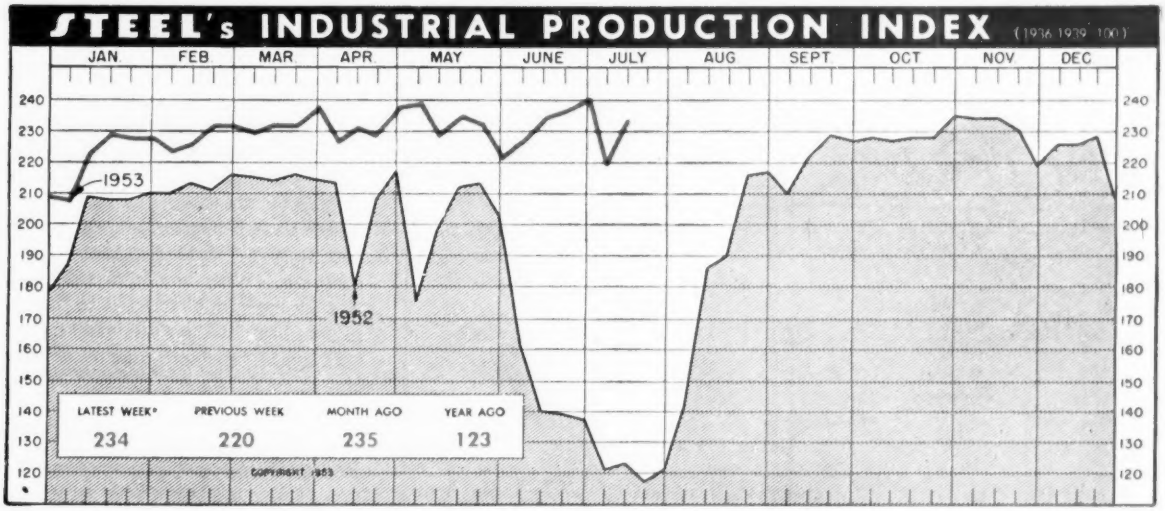
Spin-lock

U. S. Pat. No. 2,253,241

The Tighter, Stronger, Surer Fastener!

108 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

The Business Trend



*Week ended July 11

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automotive Assemblies (Wards' Reports) 20%.

Vacations and close-downs slow post-holiday recovery of industrial production. High rate of liquid savings should be watched closely by manufacturers

RETURN of industrial output to the production peak achieved before the holiday has been slowed by close-downs and vacations.

Production is held back in both the automobile and steel industries by close-downs. The customary summer repair of steel installations has caused the steel operating rate to fall about 6.5 per cent from the year's high, posted in March. Automobile outturn is down about 27,000 units from the April peak, with a so-called parts shortage causing the reduction. Loadings of railroad revenue freight are also off from the year's summit, attained immediately before the holiday, as the mass vacation of coal miners cut bituminous coal production almost 85 per cent in one week and dropped railroad coal loadings by more than 110,000 cars.

Difficult Feat . . .

Although production of cars by the automobile industry continues on a high level, it is doubtful whether the industry can accomplish the goal set for the third quarter.

Were automobile manufacturers to build the 1,860,300 passenger cars scheduled for July-September completion the total for the period would be second only to the record, established in the third quarter of 1950. But with trim shortages cutting output at Dodge and Chrysler and with Nash and Kaiser still not in production due to the aftereffects of a supplier strike, the third quarter goal may be set too high. Moreover, retail sales though high, have not kept pace with production.

If the goal is attained it will be due to the production race between General Motors and Ford. Their hefty outturn is increasing their share of the market and at the same time is hurting sales of other makes, which may explain the continuing production lag of some other makers. During the week ended July 11, the combined output of plants in the U. S. and Canada totaled 168,040 cars and trucks, according to *Ward's Automotive Reports*.

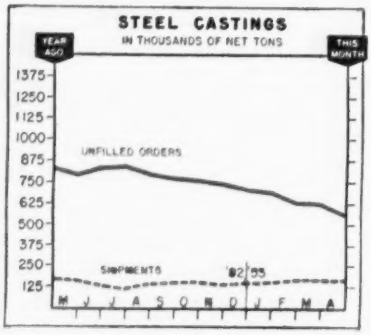
Present Perspective . . .

With output restricted by these factors, STEEL's industrial production index, during the second week of July, registered 234 per cent of the 1936-1939 average. By way of comparison, this output is 111 per cent greater than the same week in 1952, when the steel strike was doing its greatest damage to production. Furthermore present production is about 25 per cent higher than the corresponding week in 1950, America's greatest production year.

Running Downhill . . .

The impact of the Independence Day holiday and the mass vacations of coal miners sent loadings of revenue freight running rapidly downhill during the week ended July 4. All the component elements of railroad revenue freight decreased from the previous week, with coal loadings falling harder than any other. A total of 670,232 cars were loaded, 18.1 per cent less than the previous week, the Association of American Railroads reports.

With the re-equipment program of railroads approaching ever nearer to completion, declining demands are to be expected. Thus, orders for freight cars totaled 1463 in June, a drop for the third consecutive month. The backlog of orders now totals 52,315 freight cars, says the American Railway Car Institute. This is considerably less than half of what it totaled in January, 1952, and there has been a consist-

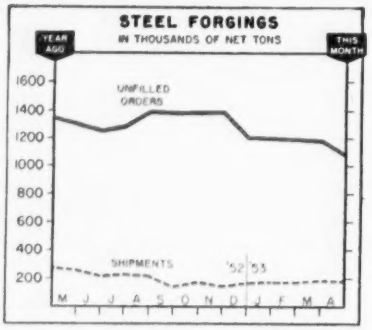


Steel Castings

Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1953	1952	1953	1952
Jan.	167.2	193.7	706.5	869.3
Feb.	175.7	174.6	644.3	856.9
Mar.	182.2	173.7	634.6	857.1
Apr.	179.6	175.1	573.6	843.0
May	....	173.6	....	804.7
June	....	141.6	....	846.5
July	....	119.0	....	855.0
Aug.	....	150.2	....	809.4
Sept.	....	158.4	....	781.9
Oct.	....	165.2	....	772.9
Nov.	....	148.3	....	751.7
Dec.	....	161.7	....	719.2
Total	....	1,925.1		

*For sale. U. S. Bureau of the Census.

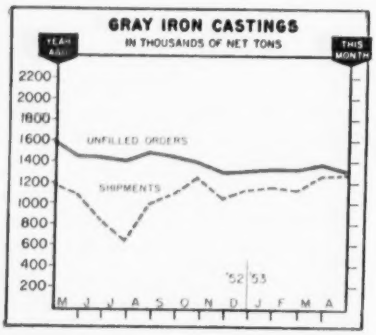


Steel Forgings*

Thousands of Net Tons

	Shipments		Unfilled Orders	
	1953	1952	1953	1952
Jan.	184	271	1,207	1,472
Feb.	184	277	1,199	1,464
Mar.	200	266	1,197	1,360
Apr.	196	277	1,082	1,349
May	....	263	....	1,319
June	....	224	....	1,248
July	....	132	....	1,290
Aug.	....	121	....	1,399
Sept.	....	150	....	1,392
Oct.	....	178	....	1,393
Nov.	....	156	....	1,399
Dec.	....	181	....	1,377

U. S. Bureau of the Census. *Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more.

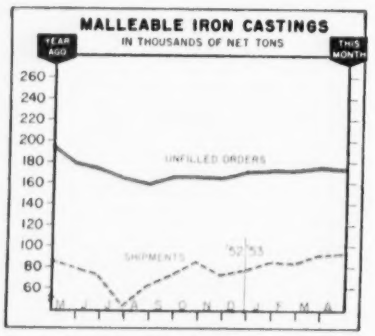


Gray Iron Castings

Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1953	1952	1953	1952
Jan.	1,162	1,199	1,333	1,801
Feb.	1,136	1,155	1,332	1,766
Mar.	1,264	1,172	1,376	1,711
Apr.	1,277	1,205	1,306	1,614
May	....	1,101	....	1,459
June	....	835	....	1,445
July	....	636	....	1,410
Aug.	....	1,002	....	1,513
Sept.	....	1,119	....	1,451
Oct.	....	1,233	....	1,392
Nov.	....	1,061	....	1,309
Dec.	....	1,142	....	1,316
Total	....	13,660		

*For sale. U. S. Bureau of the Census



Malleable Iron Castings

Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1953	1952	1953	1952
Jan.	87.2	87.0	174.8	203.0
Feb.	86.5	82.9	175.1	193.1
Mar.	94.5	81.0	177.8	196.9
Apr.	95.9	89.3	174.5	198.2
May	....	81.8	....	180.4
June	....	74.4	....	173.4
July	....	45.3	....	166.6
Aug.	....	63.7	....	162.8
Sept.	....	75.9	....	168.4
Oct.	....	88.1	....	168.6
Nov.	....	76.1	....	167.8
Dec.	....	80.6	....	173.5
Total	....	926.1		

*For sale. U. S. Bureau of the Census.

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Issue Dates on other FACTS and FIGURES Published by STEEL

Construction .....July 6	Gear Sales .....July 13	Ranges, Elec. .....Apr. 13
Durable Goods ....July 13	Indus. Production..June 22	Ranges, Gas .....May 18
Employ., Metalwk. .July 6	Ironers .....June 29	Refrigerators .....May 18
Employ., Steel ....June 1	Machine Tools ....July 6	Steel Shipments ..June 22
Fab. Struc. Steel...July 13	Prices, Consumer ..June 22	Vacuum Cleaners ..June 29
Foundry Equip. ...June 1	Prices, Wholesale ..June 1	Wages, Metalwk. ..July 6
Freight Cars .....June 1	Pumps .....June 1	Washers .....June 29
Furnaces, Indus. ..July 13	Radio, TV .....May 25	Water Heaters ....June 29

ent decline in the backlog for 10 months.

Summer Capers . . .

Repairs to furnaces and other facilities in the steel industry will continue to make steel production bob up and down during the summer months. Output is expected to jump up several notches during the week ended July 18, for the American Iron & Steel Institute estimates that furnaces poured 2,169,000 tons of steel for ingots and castings. With bookings solid for this quarter and reported to be going well for the last quarter, output will again level off near the high March peak toward the end of the summer.

Power Dive . . .

Electric power output also relaxed over the holiday. In the week ended July 4, the Edison Electric Institute reports that 7970 million kilowatt hours of electricity were distributed. This slump is only temporary. The same factors that produced the electric power records of a few weeks ago will again come to the fore.

One of the most striking factors in the enlarged sales has been the increased use by rural customers. Sales at rural rates increased 17.1 per cent during the first quarter of the year as compared with the January-March period in 1952. The group that shows the next highest increase in the use of electric power and the one in which the magnitude of increase is the greatest is the domestic category. Domestic customers used 10.1 per cent more electricity in the same period or 2.4 billion more kilowatt hours.

Procurement Policy . . .

Delivery of supplies to industry was faster in June than in May, according to a survey made by the Purchasing Agents Association of Chicago. This shorter procurement time is causing manufacturers to reduce their inventories. As a result the predominant policy today is to hold to the lowest operating level consistent with deliveries, the National Association of Purchasing Agents reports.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	94.5	96.0	14.5
Electric Power Distributed (million kwhr)	8,095	7,915	6,988
Bituminous Coal Output (daily av.—1000 tons)	263	1,675	186
Petroleum Production (daily av.—1000 bbl)	6,430[1]	6,451	6,075
Construction Volume (ENR—millions)	$191.6	$256.2	$381.7
Automobile, Truck Output (Ward's—units)	168,040	140,491	70,616
TRADE			
Freight Car Loadings (unit—1000 cars)	780[1]	670	572
Business Failures (Dun & Bradstreet, number)	139	169	156
Currency in Circulation (millions)[3]	$30,279	$30,152	$29,148
Dept. Store Sales (changes from year ago)[3]	+1%	+3%	0%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,017	$18,554	$14,362
Federal Gross Debt (billions)	$266.3	$266.2	$263.0
Bond Volume, NYSE (millions)	$12.3	$13.1	$12.5
Stocks Sales, NYSE (thousands of shares)	4,571	4,386	5,099
Loans and Investments (billions)[4]	$75.5	$76.1	$77.5
United States Gov't. Obligations Held (billions)[4]	$29.5	$29.2	$33.6
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	189.18	189.18	171.92
STEEL's Nonferrous Metal Price Index[6]	224.7	224.7	224.6
All Commodities[7]	109.7	109.4	111.8
All Commodities Other Than Farm and Foods[7]	114.2	114.1	112.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1953, 2,254,459; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

Inventory Inspection . . .

Inventories may still be at a high level but so is the ratio of sales to stocks. The latter is much more important since it places supplies in a proper relationship. With the high sales of the second quarter, it was necessary to carry a large inventory in order to capitalize on sales. Furthermore, continued large scale reduction of inventories may no longer be desirable or feasible. The truth of this statement lies in the change that has evidently taken place in inventories over the past nine months. It appears that the growth of stocks during the past quarter was largely in finished goods, whereas it was in goods in process during the first quarter and in purchased materials during the last quarter of 1952.

Overdue Accounts . . .

This growth in finished goods has been accentuated by the declining sales of the past month. And the decline in sales during June from the spring peak is probably responsible for the decrease in the number of accounts discounting or paying their trade invoices when due. The decline is particularly noticeable in the manufacturing-industrial group, where 87.8 per cent were reported discounting or prompt in May, as compared with 90.5 per cent in May, 1952, says the Credit Research Foundation.

Savings Habit . . .

The $2.5 billion that individuals saved during the first quarter of 1953 was the highest for any first quarter in the postwar period.

Although savings accounts and insurance continued near the high rates of recent periods, the increase in holdings of U. S. government bonds was sizable. These holdings at the end of the first quarter were greater than any similar period since 1947.

Merchandising Memo . . .

With mortgage indebtedness rising more during this period than in the comparative 1952 months and with installment debt rising, counter to the usual repayments of the first quarter, it seems that the part of the population that can least afford it supported, to a large extent, the production expansion of the first three months. The other part of the population prepared for greater security. Since spending is contagious, manufacturers can hope that the more secure part of the population will take its future share of output.

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They can be used for longer periods because they resist oxidation, prevent rusting and corrosion.

They can be applied by every method used in the general lubrication of industrial machinery.

They have low carbon content In compressors, for instance, any carbon that does form is soft and fluffy, is easily blown off, does not build up.

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Men of Industry

JOHN V. BOARDMAN
. . . v. p., Pittsburgh Ferrous Products

STEPHEN RASUL
. . . Acme Steel engineering post

K. V. HACKMAN
. . . heads Southwest Products

John V. Boardman was elected vice president in charge of the Mifflin Junction plant of **Pittsburgh Ferrous Products Co.**, Glassport, Pa. Associated with the steel industry since 1929, he was at the Pittsburgh Works of Jones & Laughlin Steel Corp. from that date until 1946. Since then he has been with Worth Steel Co. and Colorado Fuel & Iron Corp.

William F. Jenkins was appointed sales manager, Butterfield Division, **Union Twist Drill Co.**, manufacturer of metal cutting tools with plants at Derby Line, Vt. and Rock Island, Que. He succeeds **L. H. Laythe** who continues as office manager and sales consultant. **Blaine T. Hall** will assist Mr. Jenkins in sales promotion and advertising and **James T. McFadgean** becomes manager of the newly organized customer service department.

Nils H. Lagerstrom was elected vice president of **Damascus Tube Co.**, Greenville, Pa. He had been general manager.

Jack Lewis was elected vice president in charge of all production by **Hyster Co.**, Portland, Oreg. He has been with Hyster since 1942, following 14 years with Caterpillar Tractor Co. where he was tool design supervisor.

Acme Steel Co., Chicago, appointed **Stephen Rasul** manager of design and production engineering for its Riverdale plant, Riverdale, Ill. **Thomas Fullerton** was named chief engineer in charge of all machine design and production engineering activities. **F. Richard Meyer III** was made assistant to the president, replacing **Christopher D. Norton**, who now heads two subsidiary companies.

James L. MacDowell, associated with **Standard Pressed Steel Co.**, Jenkintown, Pa., for 20 years, was made manager of tooling and quality. He moves up from superintendent of the automatic screw machine department and succeeds **Albert A. Leedom**, assigned to the staff of Cooper Precision Products, an SPS subsidiary in Los Angeles.

R. E. Doyle was made Detroit district sales manager, steel and tubes division, **Republic Steel Corp.**

E. J. Byrnes Jr. was appointed assistant general manager of sales, eastern division, **Colorado Fuel & Iron Corp.**, located at New York.

Arthur V. Peterson, formerly with the Atomic Energy Commission, has joined the staff of the vice president in charge of engineering of **American Machine & Foundry Co.**, New York.

K. V. Hackman is the new president of **Southwest Products Co.**, Duarte, Calif., manufacturer of plain self-aligning bearings and push-pull controls. **W. D. Tracy** was made plant manager. Mr. Hackman also acts as chief engineer. Mr. Tracy formerly was with Hughes Aircraft Co.

Bert J. Aamodt was named assistant manager of **Capitol Foundry Co.**, Phoenix, Ariz., which is owned by National Malleable & Steel Castings Co. For the last ten years he has been National Malleable's Chicago works sales manager and is succeeded there by **John P. Kelleher.**

Thomas W. Gabriel was appointed assistant vice president-sales, **Jessop Steel Co.**, Washington, Pa. He served nine years with Firth-Sterling Inc., the last four as general sales manager.

Buckeye Tools Sales Division, Buckeye Tools Corp., Dayton, O., appointed **E. B. Meynard** general sales manager and **R. V. Shaffer** field sales manager.

Illinois Tool Works, Chicago, announces that **Thomas C. Witter** is being returned to the home office for an assignment in developing sales on Shakeproof Division's standard product lines. For the last five years he has been sales

JOHN A. MARSH
. . . International Nickel v. p.

PHILIP B. TURLEY
. . . Tube City Iron & Metal v. p.

WILLIAM W. EGE
. . . Copperweld Steel div. v. p.

representative in the Shakeproof New England territory.

John A. Marsh, assistant vice president and manager of operating department of **International Nickel Co. Inc.,** New York, was elected vice president of the company, in general charge of all plant operations in the United States. He succeeds the late **Hugh J. Fraser. J. Roy Gordon,** vice president and general manager of Canadian operations, International Nickel Co. of Canada Ltd., was elected to its board of directors.

J. W. Campbell was made assistant works manager of **Colorado Fuel & Iron Corp.'s** Wickwire-Spencer plant in Buffalo.

George W. Anselman resigned as vice president-general foundry superintendent, **Beloit Foundry Co.,** Beloit, Wis., to establish a consulting service, Box 203, Rockton, Ill. In addition to acting as consultant for Gerwin Industries, Michigan City, Ind., he will offer consultant service to the foundry industry.

James B. Black Jr. was promoted from assistant to manager of sales in Denver for U. S. Steel Corp.'s **Columbia-Geneva Steel Division.**

Theodore J. Salow Jr. succeeds his father, **Theodore J. Salow Sr.,** resigned, as president of **Spincraft Inc.,** Milwaukee. **George A. Mast** was named executive vice president and general manager; **George F. Farley** vice president-sales; and **K. W. Salow** secretary- treasurer.

Tube City Iron & Metal Co., Glassport, Pa., elected **Philip B. Turley** vice president. He joined the firm in 1951 after serving Luria Steel & Trading Corp. in its Cleveland, Detroit and Pittsburgh offices.

Crucible Steel Co. of America appointed **Lawton Howell** works controller at its Sanderson-Halcomb Works in Syracuse, N. Y. He is succeeded as cost accountant at the Midland, Pa., Works by **F. W. Bloom.**

Clearing Machine Corp. appointed **Rudolph Winters** as superintendent of its Hamilton, O., plant. He joined the firm in 1940 and was, until recently, a foreman at its main plant in Chicago.

William W. Ege was elected vice president in charge of the wire and cable division of **Copperweld Steel Co.,** Glassport, Pa. He succeeds **William J. McIlvane,** resigned, but who is retained as a consultant to the president. Prior to his new assignment, Mr. Ege was vice president and chief engineer.

M. Milo Millette was appointed works manager at **American Car & Foundry Co.'s** Buffalo plant, where he has been acting head since February.

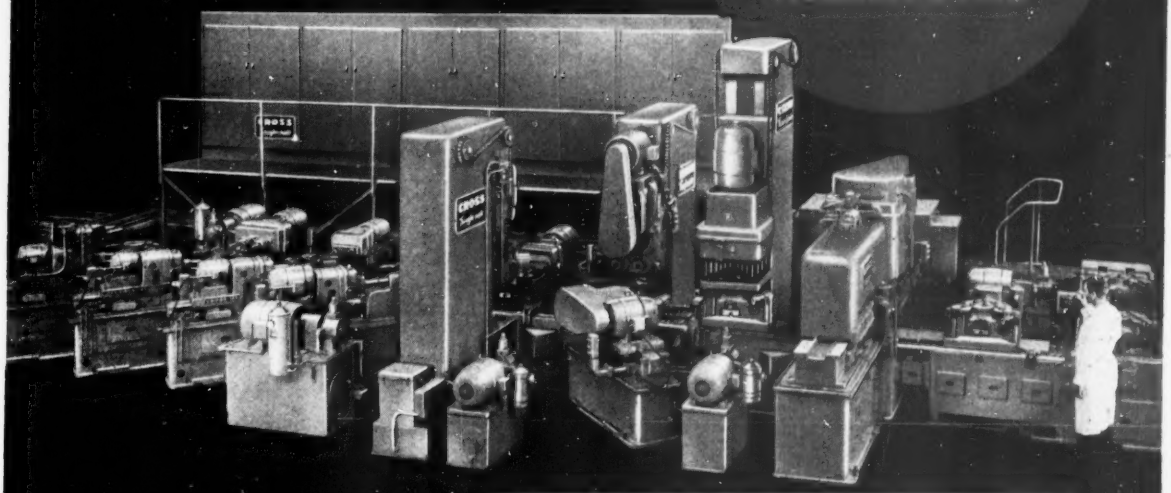
Rome Cable Corp., Rome, N. Y., created the new position of executive vice president and appointed **John H. Dyett** to that post. **Gerard**

RUDOLPH WINTERS
. . . plant supt. at Clearing Machine

JOHN H. DYETT
. . . exec. v. p. at Rome Cable

Another Transfer-matic by Cross

Completely Machines Exhaust Manifolds



★ Machines right and left exhaust manifolds completely — 42 milling, drilling, boring, chamfering, and tapping operations.

★ 230 pieces (115 right and 115 left) per hour at 100% efficiency.

★ Ten stations—one loading, one unloading, three milling, three drilling, one boring, one tapping.

★ Palletized work holding fixtures with power wrenches for automatic operation.

★ Cross-Drive for milling cutters.

★ Other features: Built-in chip conveyor and automatic removal of chips from fixtures after each cycle, pre-set tools, J.I.C. standard construction, automatic lubrication, hardened and ground ways.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

CANUTE R. OLSEN
. . . U. S. Steel Supply Div. post

ROBERT L. CLARK
. . . purchasing dir. at Kropp Forge Ordnance

CHARLES MODERSOHN
. . . chief eng., Warner Electric div.

A. Weiss succeeds Mr. Dyett as secretary.

Canute R. Olsen was appointed manager of the general sales staff of United States Steel Supply Division, **U. S. Steel Corp.**, Chicago. He succeeds **Harold A. Miller**, who has joined Isthmian Steamship Co., New York, as personnel manager. **Gladstone C. Hill** becomes assistant manager of sales at Indianapolis for the corporation.

General of the Army Omar N. Bradley was appointed chairman of the board, **Bulova Research & Development Laboratories Inc.**, New York. He joins the company when he goes on the inactive list on Aug. 16.

John W. Raisbeck, who had been with Packard Motor Car Co. for 23 years, was named assistant general sales manager of **Kaiser-Frazer Sales Corp.**, Willow Run, Mich.

Verne Roberts was made national sales director and **Paul Redhead** national sales manager of Vocatron Division, **Vocaline Co. of America Inc.**, Old Saybrook, Conn.

Robert L. Clark was appointed director of purchases at **Kropp Forge Ordnance Co.**, Melvindale, Mich., a subsidiary of Kropp Forge Co. He has been assistant purchasing agent at Kropp Forge Co., Chicago, and with the firm for the last three years. Prior to that he served seven years as buyer for Santay Corp.

Sprague Electric Co., North Adams, Mass., elected **Dr. Wilbur A. Lazier** vice president and technical director in charge of research and engineering, and **Neal W. Welch** as vice president in charge of sales. **Dr. Preston Robinson**, former head of the research and engineering department and a member of the Sprague board, continues to serve the firm as a consulting engineer.

John L. Stewart was appointed Chicago district sales manager, **Universal-Cyclops Steel Corp. Otto F. Carl**, Chicago district sales manager since that branch was opened in 1927, continues association with the company as special representative.

Charles Modersohn was named chief engineer, industrial division, **Warner Electric Brake & Clutch Co.**, Beloit, Wis. He formerly headed the firm's electronic controls division. He will be responsible for engineering of electric brakes and clutches for industrial machinery of all types.

J. B. Mashmeyer, formerly with Armco Steel Corp., was placed in charge of quality and special products of **Newport Steel Corp.**, Newport, Ky.

At **Trane Co.**, La Crosse, Wis., **W. C. Dackis** was promoted to manager, process heat transfer sales department; **J. R. Whalen** manager of the convector sales department; **Ted W. Ernst** manager of the coil sales department; and **Lloyd E. Eater** to handle the fluid cooler division, heat transfer sales department. **Roy L. Smith** was appointed to the Philadelphia sales office.

Burnell L. Verner was appointed Pittsburgh district manager for **Luria Bros. & Co. Inc.**

OBITUARIES . . .

Charles Quillman, 54, vice president and director of sales, **Holman Mfg. Co.**, Binghamton, N. Y., died July 1.

T. Brian Parsons, manager of the permanent mold foundry, **Aluminum Co. of America**, at Cleveland, since 1951, died July 8. He joined Alcoa in 1933 and went to Cleveland from the Pittsburgh office in 1948.

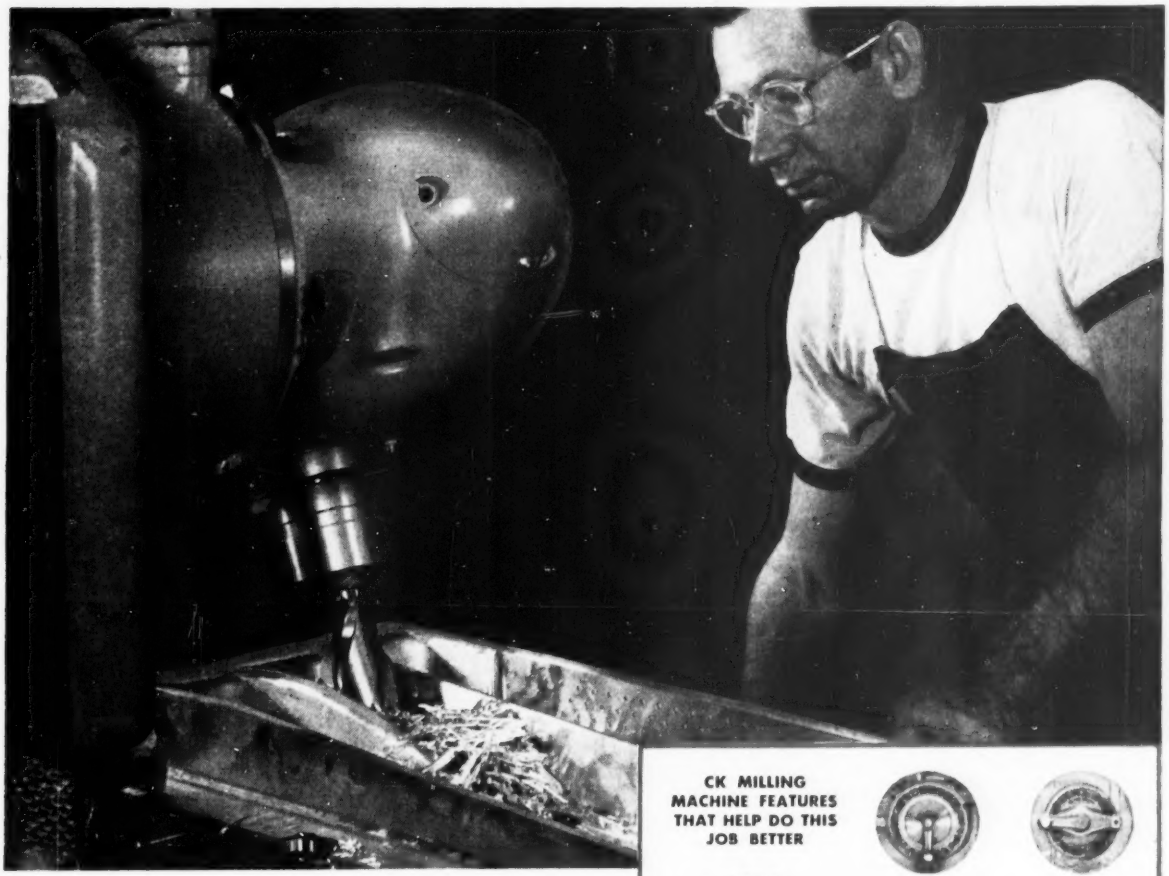
Philip E. Meidenbauer Jr., president, **Firewel Co. Inc.**, Buffalo, died July 7.

Lawrence W. Kester, 63, purchasing agent, **Benjamin Electric Mfg. Co.**, Chicago, died July 1.

Richard T. Henderson, 41, sales manager, **Allan Herschell Co. Inc.**, Tonawanda, N. Y., died July 5.

Matthew J. Scammell, president, **S. L. Allen & Co. Inc.**, Philadelphia, died June 15.

CK MILLING MACHINE SPEEDS OUTPUT OF STANDARD PRODUCTION PARTS



TEN ALUMINUM ALLOY 75ST (FORGING) AIRCRAFT SPARS PRODUCED EVERY HOUR FOR MAR VISTA ENGINEERING CO.

THE FACTS ON THIS JOB ARE: Machine: No. 6 — Model CK Plain (25hp) with heavy-duty universal Milling Attachment. **Part:** Large fusilage spar fitting — overall dimensions $39\frac{5}{16}$" x $17\frac{3}{8}$". **Material:** Aluminum Alloy 75ST (forging). **Tool:** 2-inch, 2-lip end-mill. (HSS). **Speed:** 265 rpm. **Feed:** $3\frac{1}{8}$ ipm.

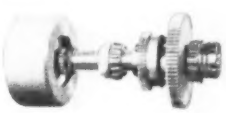
HERE'S a typical example of how relatively inexpensive tooling greatly increases the application of Kearney & Trecker's new CK milling machines . . . producing a completed part every 6 minutes. Two operations were required for each part — one, milling out the holes and recessing on the edges, then after changing the attachment setting and cutter — two, finishing the inside (see photo). For the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

CK MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

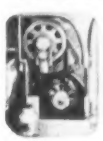
This CK milling machine has 24 different spindle speeds (13 to 1300 rpm). Its 32 different table feeds ($\frac{3}{4}$ to 90 ipm). Operator was able to pick proper *speed and feed*, benefit from high hp. modern tools.

Greater rigidity of new CK column easily absorbs vibration from heaviest cutting loads. Only single pass needed for each part.



CK's 3-bearing spindle and flywheel assures Maximum Cutter Efficiency. On this job, it meant fast metal removal and excellent finish in a single pass.

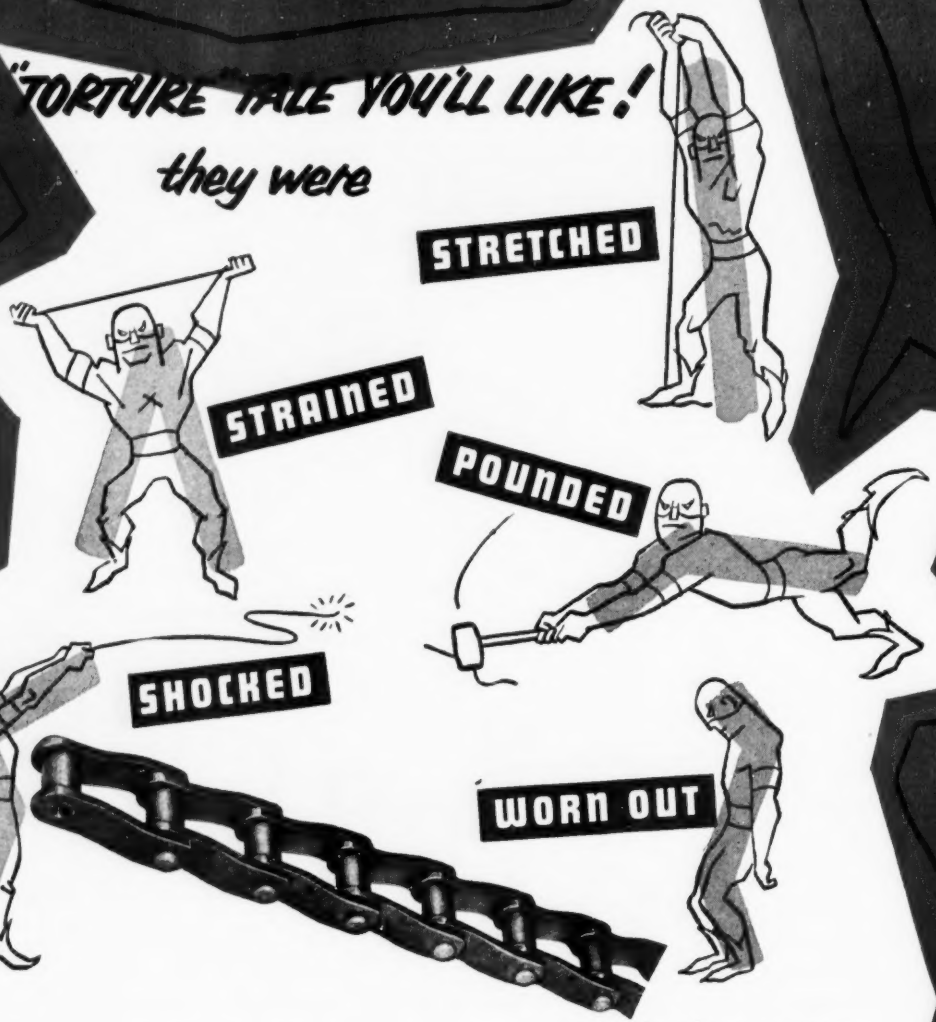
CK's new heavy duty (2" dia.) table feed screw gives greater bearing contact for smoother feed performance and sustained accuracy.



New CK machines have greater horsepower. On this job, 25 hp permitted operator to get maximum production from his modern cutter.

THIS "TORTURE" TALE YOU'LL LIKE!

they were



...and subjected to every conceivable test that a modern engineering "torture chamber" could devise. From it came a great new line of improved Rex Chabelco Steel Drive and Conveyor Chains. It wasn't easy because, as Chabelco users know, the previous Chabelco Chains were "tough," strong...hard to beat. But by making a few important design and manufacturing changes, Rex engineers produced a line of improved standard drive and conveyor chains. We call them Rex Chabelco "R" Series Drive and "RR" Series Conveyor Chains! You'll call them the best chains you've ever used!

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Corrosion Damage Cut

New air conditioning system protects ship cargoes from marine moisure damages

CORROSION of ship cargoes, a problem as old as the shipping industry itself, appears to have been halted by a system of marine air conditioning developed by Bethlehem Steel Co.'s Shipbuilding Division, Bethlehem, Pa., in conjunction with Surface Combustion Corp., Toledo, O. The system, which has been successfully tested, is termed the "Bethlehem Pressure System of Cargo Hold Dehumidification." It dehumidifies the air entering the cargo holds and prevents "sweating" of the bulkheads and dripping of this precipitation onto the cargo.

Condensation occurs under certain conditions when the temperature of moist humid air inside the cargo hold is higher than the temperature of sea water through which the vessel is passing. Sweating resulting from this condition often damages or impairs corrodable or moisture-sensitive cargo.

Air Dehumidified — However, if the air is sufficiently dehumidified so that the moisture does not precipitate out of the air, condensation is eliminated and atmospheric corrosion becomes negligible.

Tests were conducted on the *S. S. Yorkmar* on a recent voyage from Philadelphia to the West Coast, via the Panama Canal. Moisture is removed from the air in the holds of this ship by a 7000 cubic-foot-per-minute dehumidifier manufactured by Surface Combustion Corp. This unit employs a lithium chloride base absorbent solution.

On the test run, the *Yorkmar* was loaded with 11,000 tons of finished steel at Sparrows Point, Md., and Philadelphia. Loading consumed ten days, during which it rained almost constantly. Within a few hours after the air conditioning unit began operating, the rain-drenched cargo and holds were dry; they remained in that condition for the duration of the voyage, although the vessel passed through waters varying widely in temperature. Inspection after arrival revealed that there was no evidence that any corrosion had taken place from the time of sailing of the ship and reopening of the holds for discharge of the cargo.

Developed primarily to enable Bethlehem to deliver sea-shipped steel in good condition to its Pacific Coast customers, the new system is regarded as presenting an efficient method of solving the problem of contamination and corrosion of moisture-sensitive products—a hazard of the sea which has cost importers and exporters untold damages from the earliest days of civilization.

Crescent Machine Liquidating

Crescent Machine Division of Rockwell Mfg. Co. at Leetonia, O., has gone out of business. The plant's tools, machinery and other equipment are being moved to some of the 16 other plants owned by Rockwell. The plant will be disposed of at a later date. The plant, which makes woodworking tools, such as saws, joiners and planers, has been struck since May 1 by United Construction Workers, Local 175, affiliated with United Mine Workers. The plant was opened in 1894 and was sold to Rockwell in 1945.

U. S. Pipe & Foundry Moves

There will be no more Sloss-Sheffield Steel & Iron Division of U. S. Pipe & Foundry Co. after Aug. 1. The entire operations will be known thereafter as U. S. Pipe & Foundry Co. The former Sloss-Sheffield main office building in Birmingham is being doubled in size to accommodate U. S. Pipe's headquarters which are being moved this month from Burlington, N. J.

Detroit Firm Appoints Agent

Detroit Steel Products Co., Detroit, appointed Palmer G. Lewis Co., Seattle, as distributor of its galvannealed garage doors.

Otis Observes 100th Year

Otis Elevator Co., New York, is celebrating its 100th anniversary of its founding in 1853 by Elisha Graves Otis. In the centennial report, reviewing the accomplishments of Otis in its remarkable growth, L. A. Petersen, president, says: "As a part of the business world, we share in the obligation to demonstrate . . . . to the people of the world the superiority of our system of democratic competitive enterprise in providing for the general welfare."

Saves on Employee Idea

Construction of this "ferris wheel" fixture for assembling belt frames is saving Consolidated Vultee Aircraft Corp., San Diego, Calif., about $2000 annually. It makes it possible to turn the assembly to any convenient position; frames had been assembled previously on fixed horizontal tables

Wickwire Opens Branch Office

Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Denver, opened a district sales office and warehouse at 7930 Palm St., New Orleans. Ford L. Brooke is district manager of the New Orleans office.

Alten Buys Pumping Unit Line

Alten Foundry & Machine Works Inc., Lancaster, O., purchased the Ideco pumping unit line from Dresser Industries Inc., Dallas. Although this acquisition expands Alten's activity in the petroleum equipment field, it is not to be construed, officials say, as an indication Alten is retiring from the contract manufacturing field. Expansion begun earlier this year in the company's foundry, structural and machine shops is nearing completion. The effect of this new construction is to double capacity of

custom made castings, machine work and sub-assemblies.

National Can Plans Expansion

Standard Oil Co. (Ohio), Cleveland, sold some machinery and equipment in its lithograph can plant in that city to National Can Corp., New York. The latter company has plants in Hamilton, O., New York, Baltimore and Chicago. Its subsidiary, Warren Metal Decorating Co., operates a plant in Warren, O. National Can plans to build a plant in Cleveland.

Engine Maker Buys Building Site

Ruston & Hornsby, England, manufacturers of marine and stationary diesel engines, locomotives, pumps and boilers, through their Canadian branch, Ruston & Hornsby Ltd., purchased a site south of Dundas, Ont., according to an announcement by the Toronto Industrial Commission.

Fabricator Moves to El Monte

Slide-View Steel Door & Window Co. moved into its three new factory buildings at 1535 N. Tyler Ave., El Monte, Calif. Executive and sales offices remain at 521 N. La Cienega Blvd., Los Angeles.

"A" for Accuracy

A TIN PLATE thickness gage has been developed which measures the thickness of tin on steel to accuracies of one-millionth of an inch while the tin plate is traveling at high speeds as a continuous sheet. The instrument, engineered by Jones & Laughlin Steel Corp., Pittsburgh, will be manufactured by Applied Research Laboratories, Glendale, Calif., producer of spectrochemical equipment.

Canadian Fabricator Expands

Ontario Steel Products Co. Ltd., Toronto, is erecting two buildings in Milton, Ont., for the manufacture of automotive parts. The plant is expected to be ready for operation early in 1954. Larger capacity is needed because of expanded activities of Canadian automobile makers.

Distributor Forms Subsidiary

Brace-Mueller-Huntley Inc., Syracuse, N. Y., steel and aluminum warehouse distributor and mill representative, established a new company, Eastern Brace-Mueller-Huntley Inc., to be located at Albany, N. Y.

Foundry Changes Name

Carbon Malleable Casting Co. Inc., Lancaster, Pa., changed its name to Pennsylvania Malleable Iron Corp. This is part of the firm's building and expansion program which was begun in 1948. Since that time, the company has spent about $250,000 on new equipment for molding, annealing, melting and cleaning of castings. New buildings have been erected and a new line of marine hardware is being produced. Charles P. Speitel is president; Leo G. Emig, vice president and treasurer; Paul M. Hufford, secretary.

Hagan Gets Furnace Contracts

Orders to furnish the forging furnaces for U. S. Hoffman Machinery Corp.'s shell plant in Scranton, Pa., were awarded to George J. Hagan Co., Pittsburgh. Complement of the equipment to be furnished included two 30-ft rotary hearth furnaces, four 26-ft rotary hearth furnaces and four manipulators.

Ford Starts Expansion Project

Ford Motor Co. has launched a $5 million expansion project at its stamping plant in Buffalo. Ground has been broken for an addition which will house two new press lines as well as blanking and rolling equipment. Thirteen major presses have been ordered for the program, says J. B. Kendall, plant manager. The first of the new presses will be installed by early 1954 with all 13 ready for operation by March. Production capacity of the plant will be increased 10 per cent as a result of the expansion.

Instrof Inc. Organized

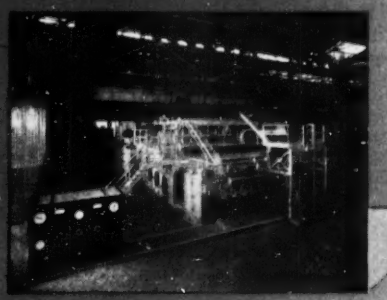
Instrof Inc. has been organized with Edgar W. Baird Jr. as president. The company, located at 4923 Pentridge St., Philadelphia 43, will manufacture a fabricated system of flattened expanded steel trough and fittings for the con-

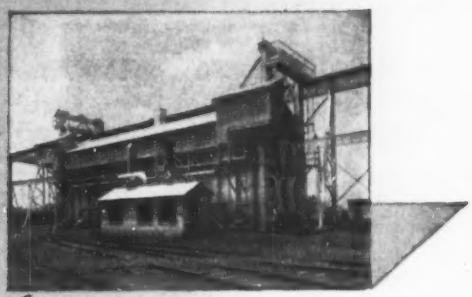
(*Please turn to Page* 74)

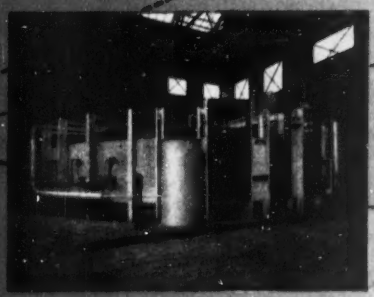
Electric Locomotives Speed Coal Haulage

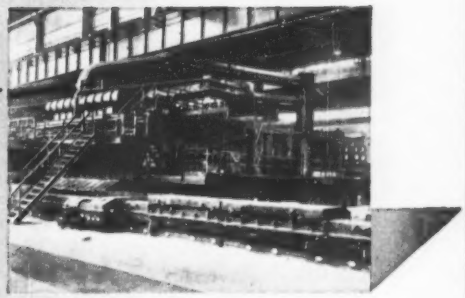
A new era in underground coal transportation was inaugurated when a self-contained main line haulage unit comprising two 20-ton locomotives powered by 37 tons of Gould-National storage batteries was installed by Olga Coal Co., a Youngstown Sheet & Tube Co. mining operation. The unit will haul bituminous tonnages more than four miles from the working faces to the shaft bottom. As shown above, the unit is over 100 ft long; stands less than 4 ft off the rails

LOOK TO RUST FOR FURNACE EFFICIENCY









METAL INDUSTRIES RELY ON *Rust furnaces* FOR GREATER OUTPUT AND PROVEN ECONOMY IN ALL PHASES OF METALLURGICAL HEATING

Whether it's an OPEN HEARTH FURNACE, SOAKING PIT, SLAB HEATING, ROTARY HEARTH, FORGING, CAR BOTTOM, ANNEALING or any other type of metallurgical furnace, you can rely on Rust's half-century of engineering know-how and furnace experience for top performance. Ask the men who operate Rust furnaces (all fuels) . . . They all say: "efficient . . economical . . automatic . . easy to operate . . trouble free . ." Whatever your need, be it either a new furnace or a modernization of existing facilities, look to Rust for the complete job.

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RUST "PACKAGE" CONTRACT

One contract covers everything . . . from blueprint through start up. Rust assumes responsibility for design, manufacture, erection, and is prepared to undertake all phases of the work with its own forces, including wiring and piping. This results in substantial savings . . . One profit instead of pyramiding ones which accrue where many subs are employed.

RUST FURNACE COMPANY

Pioneers in Furnace Design

RUST BUILDING PITTSBURGH, PA.

(*Continued from Page 72*)
tinuous support of instrument tubing. William S. Taylor is sales manager.

Oswald Refractories Co. Formed

Oswald Refractories Co. Inc. was organized by Harold Oswald and associates with headquarters at 117 N. Meramec Ave., St. Louis 5. The firm will act as exclusive sales manager for Alsey Brick & Tile Co., Alsey, Ill., and as special sales representative for Wellsville Fire Brick Co., Wellsville, Mo. The firm also is sales representative for Vesuvius Crucible Co., Swissvale, Pa., manufacturer of crucibles, stopper heads and graphite refractories for steel mills and foundries. Mr. Oswald is president and treasurer of the new corporation; Harry C. Hampe, vice president.

Norris-Thermador May Buy Firm

Norris-Thermador Corp., Los Angeles, is negotiating for purchase of A. J. Lindemann & Hoverson Co., Milwaukee. Norris-Thermador makes automobile wheels, steel tanks, electric house heaters, cooking ware, etc. The Milwaukee firm makes electric stoves and water heaters, oil stoves and heaters, home freezers and refrigerators.

Handle With Care

THE SPADE used to break ground for Westinghouse Electric Corp.'s Research Center in Pittsburgh early last month is the only one of its kind in the world. It is made of titanium—a metal so rare four years ago that it was almost unknown in metallic form.

The high strength-weight ratio of titanium has provided the impetus for the recent and expensive development of methods of producing and fabricating this metal. Westinghouse now uses alloyed titanium in construction of jet aircraft engines and in some marine applications.

A titanium spade was used at the ground breaking ceremony to symbolize the tremendous strides that have been made through industrial research in producing materials that provide better end products.

American Can To Expand Plant

American Can Co., New York, is planning a big expansion of its Stockton, Calif., container manufacturing plant, completed only about a year ago.

Morrison Steps Up Operations

Morrison Railway Supply Co., Buffalo, has launched an expanded program to recondition railroad freight cars and will lease the equipment. The cars are surplus equipment, acquired from carriers that have bought new equipment. Under a plan recently developed, the cars are leased to short line railroads, enabling them to obtain equipment without a large outlay of capital.

White Opens Warsaw Plant

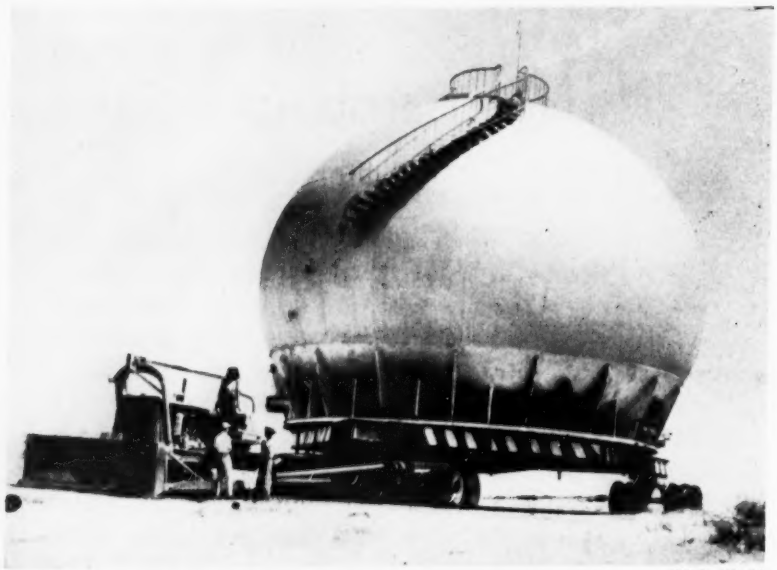
White Metal Rolling & Stamping Corp., Brooklyn, N. Y., opened a factory at Warsaw, Ind., for melting, casting, extruding and finishing magnesium and aluminum products. Facilities for manufacturing the company's line of stepladders and extension ladders are included. It is expected that additional finished products will be added and that some extruded forms, such as rods, bars, tubes, shapes, structurals and strip will be made available to industries in that area.

New Firm To Make Equipment

Formation of Bryant Industrial Products Corp. and its purchase of the principal assets and production facilities of Bryant Industrial Division, Affiliated Gas Equipment Inc., was announced by Robert M. Buck, president of the Cleveland enterprise. The new firm, located at 17700 Miles Ave., will specialize in the design, production and marketing of industrial gas combustion equipment. Lawrence R. Foote is vice president and John Sellors Jr., secretary-treasurer.

Ransohoff Moves Plant

N. Ransohoff Inc., producer of equipment for surface treatment of metals, moved from Elmwood, O., to larger quarters in Hamilton, O. The principal component of the new plant is the expansive fabrication shop with a pillarless interior as large as a football field. Railroad cars and trucks can load or unload inside the shop. An adjoining building houses a machine shop.



Wide World

Bulldozer Replaces Camels on Desert Job

Looks like a giant basketball on roller skates! Actually it's a 60-ton spheroid oil storage tank being hauled over the desert on multiwheeled dollies by a bulldozer. The tank, owned by Arabian American Oil Co., is being relocated

Call the most progressive lift truck dealers in your locality or write direct to us.

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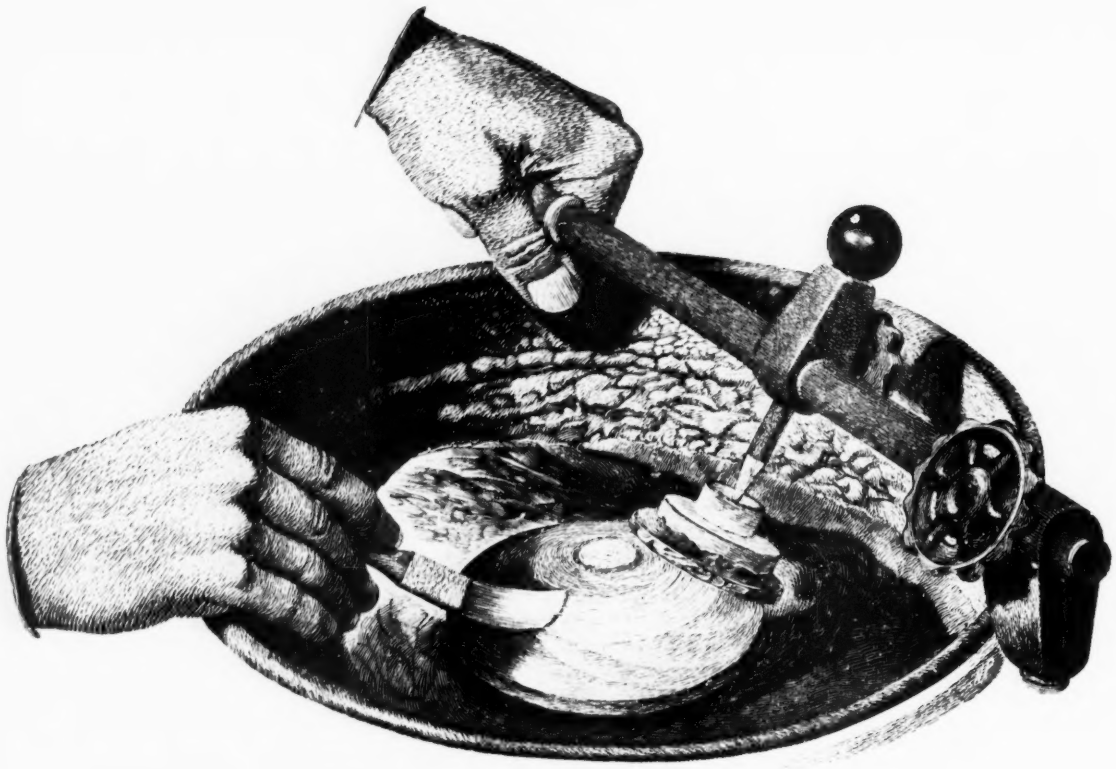
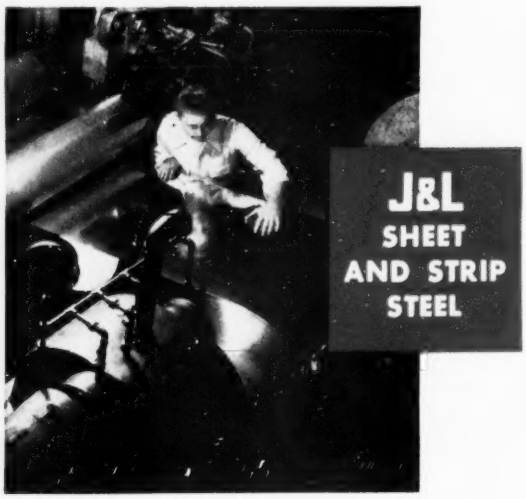
SPECIALISTS IN INDUSTRIAL SOLID TIRES AND MOLDED MECHANICAL RUBBER GOODS



Like the grinding of a lens—

STEELMAKING, TOO, REQUIRES EXACT FINISHING

Whatever your requirements for formability, uniformity, or drawing qualities, you'll find J&L Sheet & Strip . . . accurately and faithfully produced to meet your specifications. Complete understanding of the end-use of the sheet or strip you order is a rigid requirement of J&L production. You can depend upon J&L products to fit your production line.



J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH

J&L Opens Warehouse

Nashville facility assures plants in central Tennessee quicker steel delivery service

JONES & LAUGHLIN Steel Corp., Pittsburgh, opened a warehouse in Nashville, Tenn., under the managership of Louis R. Webb.

In the past, the small industries of that region have obtained their steel from warehouses in Chattanooga, 138 truck miles away, or from Memphis, 224 miles away, or even from more distant cities. The larger steel buyers, when they could wait for slower water shipments, have been buying by the barge load.

In 1952, Jones & Laughlin sold 22 per cent of its tonnage through warehouses. The entire steel industry sold 19.8 per cent of its steel products through warehouses in that year — a higher percentage than ever sold in that market before. The automobile industry which formerly was the largest direct market for steel products has now moved back to second place. Twenty-five years ago, only 11 per cent of the nation's steel products were sold to warehouses.

Donald L. Ande, acting general manager of the firm's Warehouse Division, predicts that ten years from now "we'll be selling one-fourth through warehouses, and before I get out of the steel business I wouldn't be surprised at almost one-third of the steel being sold that way."

HARRY E. CHANDLER JR.

ROBERT M. LOVE

Staff Changes for STEEL

Harry E. Chandler Jr. has joined the editorial staff of STEEL as associate editor specializing in engineering coverage. A graduate of Evansville College with an A. B. in science and of Indiana University with degrees in law and journalism, Mr. Chandler has worked as a newspaper man with the *Peru Daily Tribune, Ft. Wayne Sentinel* and *Chicago Sun-Times.* He was also a public relations associate for the Armour Research Foundation of Illinois Institute of Technology.

A second change in this publication's assignments involves Robert M. Love who becomes Pittsburgh editor, succeeding Robert E. Hall. Mr. Love was graduated from Oberlin College and also attended the University of Wisconsin. After several years as a reporter on the *Youngstown Vindicator* and *Cleveland Plain Dealer*, he joined STEEL in September, 1952. In Pittsburgh he will specialize in market, news and technical reporting.

William E. Dean also joins STEEL's editorial staff as an assistant editor working primarily on news coverage. A graduate of Ohio University, Mr. Dean has been assistant editor of the *Willard Times*, one of Ohio's best-rated weekly newspapers. He has been in the weekly field since 1949.

Buys Investment Casting Firm

Bone Engineering Corp., Glendale, Calif., purchased the Centrifugal Investment Casting Co., Burbank, Calif. The firm specializes in electroforming and manufacturing of electronic parts, under the direction of William L. Worthen, president and general manager.

Link-Belt Ltd. Boosts Capacity

Link-Belt Ltd. opened new headquarters in Toronto, Ont., to increase the company's capacity for design and fabrication of conveying, processing and engineering equipment. The plant is laid out for straight-line production. The facilities permit immediate expansion of the manufacture of conveyor and power transmission components at the firm's Eastern avenue plant in Toronto.

Bell Aircraft Starts Project

Bell Aircraft Corp., Niagara Falls, N. Y., started a $400,000 expansion program that will double the size of its rocket-motor facilities and expand its foundry. An addition will house the company's entire foundry operation while space now occupied by the foundry will be used for a drop hammer operation.

Manufactures Steel Fasteners

Screw Corp. of California has started manufacturing steel fasteners at 5565 Valley Blvd., Los Angeles. The firm, formerly known as Header Tool Service, has moved from Ventura county. Alfred Huhn is president.

Will Conduct Experimental Work

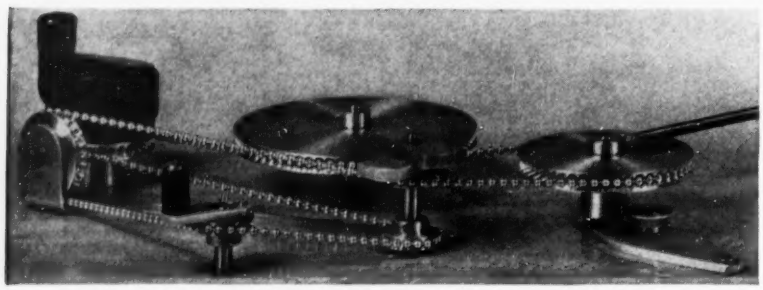
Foundry Sales & Service Associates has leased about 3000 sq ft of space in a plant building in Utica, N. Y. The plant will be used

(*Please turn to Page* 80)

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport BRASS CO. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



New low-cost Bead Belt — a sprocket drive for TV tuners, machines, etc. Timing and movement accurately controlled because slippage and backlash are avoided. Courtesy The Bead Chain Manufacturing Co., Bridgeport, Conn.

Uses of Multi-Swaging Products Challenge Imagination

Do you know that multi-swage products are among the most familiar items of everyday use? Examples are bead chain of a thousand uses; radio tube pins, terminals, jacks, contact pins and friction fasteners for electronic, electrical, and mechanical devices; stop pins, dowel pins, rest pins for appliances and novelties; spacers; shaft bearings for toys and other light duty applications.

Just how and where multi-swage products can be used advantageously for new applications in modern design is up to the imagination of designers and engineers.

Multi-swage products — hollow tubular parts with tightly swaged seams — are widely used for contact pins, terminals, jacks, and sleeves. Friction fasteners made by this process retain their spring properties remarkably well. Courtesy The Bead Chain Manufacturing Co., Bridgeport, Conn.

Efficient and Economical

The multi-swage products illustrated are made by The Bead Chain Manufacturing Company, Bridgeport, Conn. They are mainly produced from annealed narrow width strip brass (70-30) of uniformly close tolerances for composition, temper, gauge and flatness. Strip is fed into an extremely ingenious but very complicated high-speed automatic machine. It operates similar in principle to the eyelet machine except that some of the stages are designed for multiple swaging. This operation causes the metal to flow into the proper form of the product design and results in an article which is extremely work hardened with accompanying great strength and stiffness.

Multi-swage products are hollow and have a longitudinal seam which remains tightly closed because of the stresses imparted from the swaging operation. When forced apart by a tapered pin, a strong spring pressure is developed. When the pin is removed, the seam closes tightly even after the above operation is repeated thousands of times. Sizes range up to a maximum of ¼" diameter and 1½" long.

Because of the minimum waste involved, and high speed of manufacture, the multi-swage method is more economical than other methods of manufacture for producing small tubular parts in large volume. Other advantages are dimensional accuracy and a variety of shapes. Fitting up charges for tooling, etc., for new items are surprisingly modest.

The New Bead Belt

Outstanding features of bead chains are nonkinking, low friction, and unusually great strength in proportion to its weight, especially in the small sizes. Tensile strength ranges from 15 pounds to 200 pounds depending upon size and metal used.

A new development in the accurate spacing of the beads and an ingenious method of closing the ends has led to the manufacture of a belt drive from bead chain. Specially designed sprockets fit the individual beads and eliminate slippage and backlash. Timing and movement of various parts are accurately controlled.

It is being applied in TV tuners, eliminating costly gearing mechanisms. Other applications are for timing devices, recorders, air conditioners, etc.

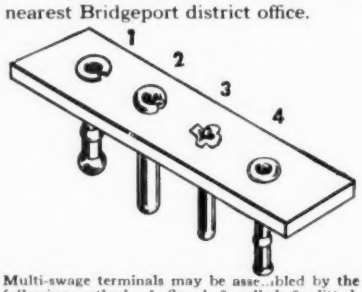
Many Alloys Used

Aside from brass, other alloys are used. Nickel Silver (copper 65%, nickel 18%, zinc remainder) is excellent as a white base for silver plated goods or for higher strength.

For decorative jewelry, Red Brass (85% copper, 15% zinc), and Commercial Bronze (90% copper, 10% zinc) are used because of their rich, golden colors.

For high strength and resistance to corrosion and wear, Silicon Bronze 609 (98% copper and 2% silicon) and Phosphor Bronze 35 (95% copper, 5% tin and 0.15% phosphorus) are recommended.

Bridgeport Brass Company is always glad to work with customers who have special metal requirements, as exemplified by multi-swage process which calls for careful control of uniformity and accuracy in gauge and temper. Fabricators desiring to improve their products through the selection of superior alloys, or who wish to reduce operating costs and spoilage by using metal designed for their particular requirements, should contact the nearest Bridgeport district office.



Multi-swage terminals may be assembled by the following methods: 1. flared; 2. rolled; 3. slitted, or 4. spun. Courtesy The Bead Chain Manufacturing Co., Bridgeport, Conn. (336)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

Copper Alloys Versus Sodium Chloride Solutions

Sodium chloride (common salt) is probably the most widely encountered corrosive agent in nature or in industry. It is the chief corrosive component of sea water, marine atmospheres, brackish waters, salt marshes, brines, perspiration, etc.

The good to excellent corrosion resistance of copper alloys towards sodium chloride solutions explains their wide use in countless applications.

In industrial processes, natural salt is the source of chlorine and sodium and practically all of their compounds such as hydrochloric acid, chlorate, sodium hydroxide, carbonate, bicarbonate, etc. It is extensively used in the preservation of food; automatic sorting of vegetables; manufacture of dyes, soaps, curing hides; dyeing and printing of fabrics, glazing pottery, metallurgy, medicine.

A solution of sodium chloride dissolved in distilled water usually has a pH value ranging from 6.0 up to 7.2 at room temperature due to the presence of dissolved carbon dioxide. When this gas is driven out after moderate heating for some time, or boiling, the pH value will reach 8.5 to 8.7 at room temperature provided care is taken to prevent atmospheric carbon dioxide from reentering the solution.

In various services the pH value of salt solutions will vary considerably due to the presence of acidic or alkaline substances which find their way into or are intentionally added to the solution. Consequently the corrosiveness of sodium chloride solutions varies appreciably due to variations in pH.

The corrosiveness of sodium chloride solutions is decelerated by the presence of silicates, phosphates, chromates, and iron compounds. Accelerating elements are dissolved oxygen, chlorine, and other gases. Other factors which accelerate the corrosion of metals in sodium chloride solutions are: higher concentration, velocity, turbulence, temperature; also suspended matter and crevices which can act as focal points for corrosion pitting.

Alloy composition and galvanic coupling with other metals may have either an accelerating or decelerating effect. The influence of these factors will be discussed in subsequent issues of this column.

Magnetron for Television

QK174 Magnetron Tube — Courtesy Raytheon Manufacturing Co., Waltham, Mass.

Illustrated is a continuous-wave frequency-modulated Magnetron used in television relay equipment. Copper-base alloys are used in its construction because of their fine workability and excellent corrosion resistance.

The mounting plate is made from yellow brass, and the tubular section and brass coupler consist of free machining brass.

Brass is also the material of choice for the Magnetron used in fire control radar equipment.

In high frequency, electronic equipment or mechanical applications, Bridgeport Brass will be glad to help you determine the brass, bronze, copper or nickel silver alloy best suited to meet your exacting specifications.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Spring and Rachet Bench Vise is said to adjust instantly to produce non-slip grip. Chain is hooked around pipe as usual and handle is depressed to adjust tension. Sliding ratchet reportedly holds handle down and maintains tension on chain till released. Available in two sizes for ½ to 2-in. pipe; for ¼ to 4-in. pipe. **No. 1313**

Lightweight Flexible Hose, spiral-wire reinforced, is said to solve dust collection and fume exhaust problems. Handles air, gases or materials in bulk by pressure, suction or gravity flow. High resistance to flexing fatigue, high tensile strength and improved abrasion resistance are claimed. **No. 1314**

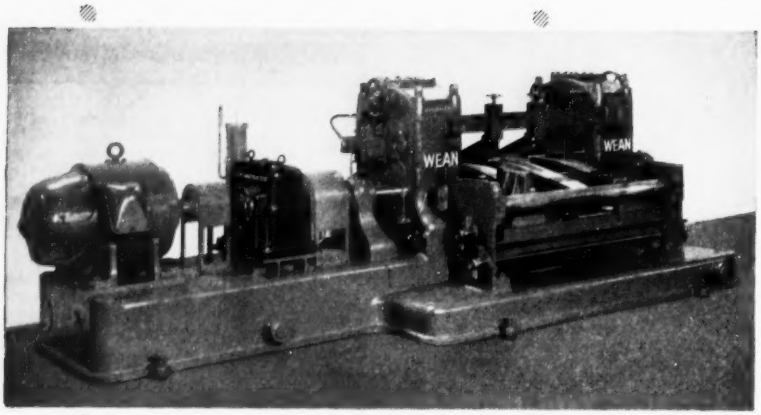
Large Diameter Hole Cutter is said to cut large circular holes in metal and plastic up to ½ in. thickness. Is free from cutter gouging and interference at cutting blade. Adjustable arm can be set to cut holes from 1¼ to 5¼ inches diameter; accessory extension arm reaches 9¼ inches diameter. Made entirely of steel. **No. 1315**

Louver Cutting and Forming Attachment cuts and forms louvers of any length in metals in a single operation. Attachment has swing-type female die in lower section that moves laterally for final end forming. Is said to produce a complete job that requires no further finishing. **No. 1316**

Lathe Duplicating Attachment is designed for runs too short to warrant setup time necessary when using long run equipment. Is said to be utilizable on lathes handling up to 13-in. work and easily installed and removed. Boring and inside diameter contours can be turned by the same method as conventional outside diameters, including tapers. Makes an 0.031 minimum radius and an unlimited maximum radius. **No. 1317**

Racheting Tool takes snap-in adaptors for internal wrenching of Allen head bolts, Phillips screws, standard sockets, turnbuckles, plugs, push-rod housings. Torque handles can be used with all heads without interrupting wrenching operations. Thin-walled sockets come in a range from ⅜ to 4 inches in 1/16-in. increments. **No. 1318**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL
BRIDGEPORT BRASS
BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal
Warehouse Service with Slitting Facilities in Principal Cities
Advertisement



H & S SPEED REDUCERS play a part

in side trimming

strip steel at

high speeds

• Cutting strip steel at high speeds is a tough job and Horsburgh & Scott Speed Reducers play an important role as part of the Wean Side Trimmers . . . available in various sizes for edge trimming hot and cold rolled strip from .006″ to ⅜″ thick. This is only one of the many fields in industry where H & S Speed Reducers are handling tough jobs for long uninterrupted periods with great savings in maintenance. It will pay you to talk with our engineers about your speed reduction problems.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

(Continued from Page 77)

for experimental work and will not now engage in manufacturing.

Standards Go Higher

SAFETY CODE as revised by American Standards Association, New York, recognizes that men of today are taller. The code, incorporating the most modern safety practices for the protection of operators of power machinery, requires the guarding of all transmission equipment to minimum heights of 7 ft. Previous requirement was that transmission equipment be guarded to minimum heights varying from 5 ft 6 in. to 6 ft 6 in.

Realization of the need for guarding machinery to greater heights came during World War II. Practices gradually have changed accordingly, so that the revised code brings the requirements into line with them.

For the first time, this edition of the 26-year-old code includes safety requirements for V-pulleys and V-belt drives. The code deals with the guarding of all revolving and reciprocating parts of equipment used in the transmission of power.

Acts as Wire Rope Distributor

Smith Pipe & Steel Co., Phoenix, Ariz., has been appointed distributor of wire rope products in the Arizona and New Mexico area by Bethlehem Pacific Coast Steel Corp., Los Angeles.

National Slag Ltd. Organized

A new company, National Slag Ltd., will erect a plant in Hamilton, Ont., where it will process blast furnace slag for concrete aggregate under agreement with various steel producers, including Steel Co. of Canada Ltd., Hamilton. The new company is equally owned by Canada Crushed & Cut Stone Ltd., Standard Paving & Materials Ltd. and Buffalo Slag Co. Inc. A plant will be erected at a cost of about $1 million.

WHITING

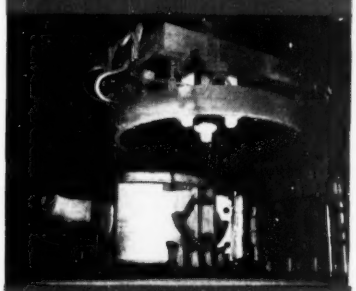
Hydro-Arc

ELECTRIC FURNACES

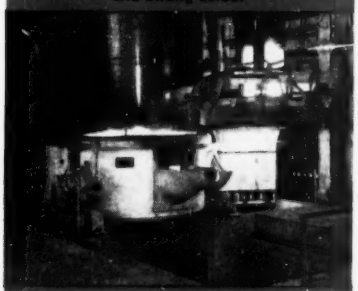
HERE'S THE "Pace-Setter" IN ELECTRIC MELTING!

You ask, "What electric furnace offers the most advantages?" The answer is WHITING HYDRO-ARC because of its important, advanced engineering principles! To name a few:

- **The Hydro-Arc Automatic Electric Clamp,** pioneered by Whiting, saves up to 90% of furnace down-time for slipping electrodes. It also means an 8% increase in operating time and production . . . and in addition, the elimination of the hazardous electrode slipping operation.
- **The Unique Hydro-Arc Top Charge,** a load factor improvement, reduces furnace down-time for recharging to only a few minutes. Because of its sound, basic simplicity, limit switches are eliminated and maintenance is held to a minimum.
- **The Hydro-Arc Air-Counterbalanced Hydraulic Electrode Positioning Equipment** assures less electrical energy and electrode consumption as well as improved metallurgical control and longer refractory life.

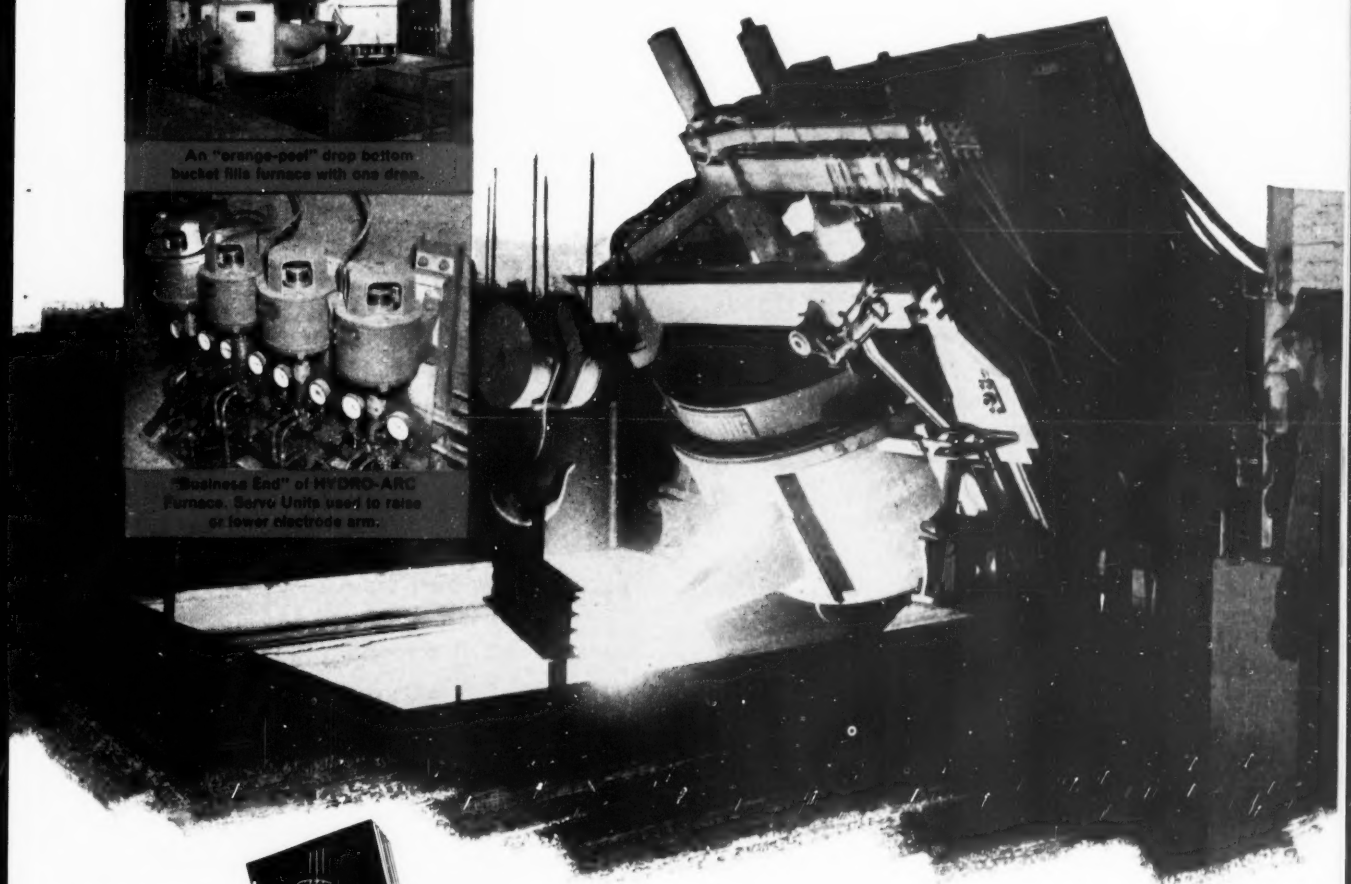


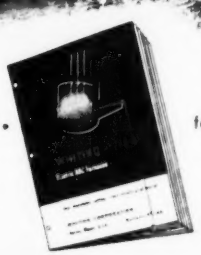
Hydro-Arc furnace with roof lifted and swung aside.



An "orange-peel" drop bottom bucket fills furnace with one drop.

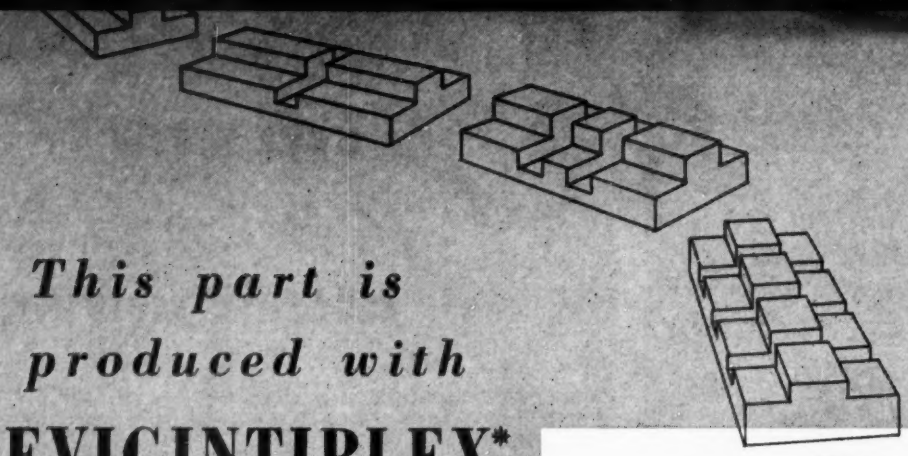
"Business End" of HYDRO-ARC Furnace. Servo Units used to raise or lower electrode arm.





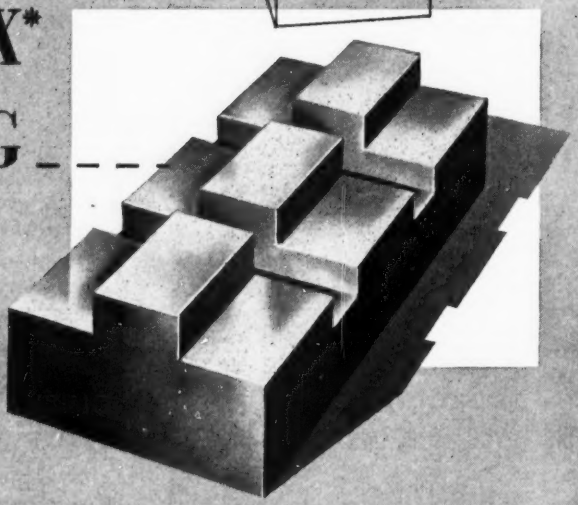
Write today . . . for 40 page bulletin FY-168. It completely describes Whiting Hydro-Arc Electric Arc Furnaces!

WHITING CORPORATION
15643 Lathrop Avenue, Harvey, Illinois



This part is produced with

UNDEVIGINTIPLEX* BROACH TOOLING



** to have nineteen-fold use*

A metal parts manufacturer recently asked Detroit Broach for broach tooling which could produce 19 different sizes of a similar part. Because production of each size was low, it was essential that a universal tooling set-up be created to realize the full economies of broaching.

The problem involved the broaching of a tongue and one, two or three cross slots in the metal parts which varied in width and length.

Detroit Broach engineers tackled the problem and came up with undevigintiplex tooling. Two stations were provided on a 25-ton single ram vertical broaching machine to broach the tongue and the cross slots. To take up for the variation in the cross slots of the 19 different sized parts, spacers were used between the broaches. And for the differences in width and length of the parts, inserts were used in the workholding fixture. Result . . . 19 different sized parts produced in a single tooling set-up!

This is just typical of the economies that can be had through universal broach tooling when a number of similar low production parts are needed by manufacturers. You, too, may have an application that can be materially reduced in time or cost by the economy of broaching. It will pay you to consult Detroit Broach for engineering or production data.

DETROIT BROACH COMPANY

20201 SHERWOOD AVE. • DETROIT 34, MICH.

Technical Outlook

LEAK DETECTIVE— Mass spectrometers are used by Alco Product Division, American Locomotive Co., New York, to check for leaks in pipe welds. Part being tested is evacuated to an internal pressure of 0.1 micron. Helium is injected under a tracer-gas retaining hood placed over the part; and if there is a leak, the helium is drawn into the part and detected by the mass spectrometer. It's estimated mass spectrometer misses leaks equal to one drop of water per 100 years.

CURTAINS FOR COLD—Heating installation at Tool Steel Gear & Pinion Co., Cincinnati, features a heat curtain that stymies winter winds when the truck door is opened. A bypass duct from the heating system leads to a trench that parallels the door. When the overhead door rolls open it trips a damper which directs warm air into the trench and blows it upward to screen the entire doorway. When the door closes, it diverts warm air elsewhere. Another advantage: No icing near the doorway.

GROWING UP— Auto industry is using powder metallurgy to make tough machine parts. New development, made by old processes, has properties similar to those of mild carbon steels. It will withstand high stress without cracking and has bendability double or treble that of most other iron powder metals. Application: Substitute for parts formerly made from forgings or bar stock.

METHODS MERGE— Top Air Force officers, in their search for metal airframe parts of minimum weight and top physicals, are examining the potentialities of a possible merger of the casting and forging techniques. This new concept is based on the fact that a certain amount of working raises the physicals, but excessive working induces fatigue. Excessive working induces fatigue particularly in the metals which normally have large grain structure—notably magnesium, aluminum and titanium. The proposal calls for using castings as the blanks in the forging operation. By starting out with castings of the desired shape and dimensions, the need for excessive working to fill the closed forging dies would be eliminated.

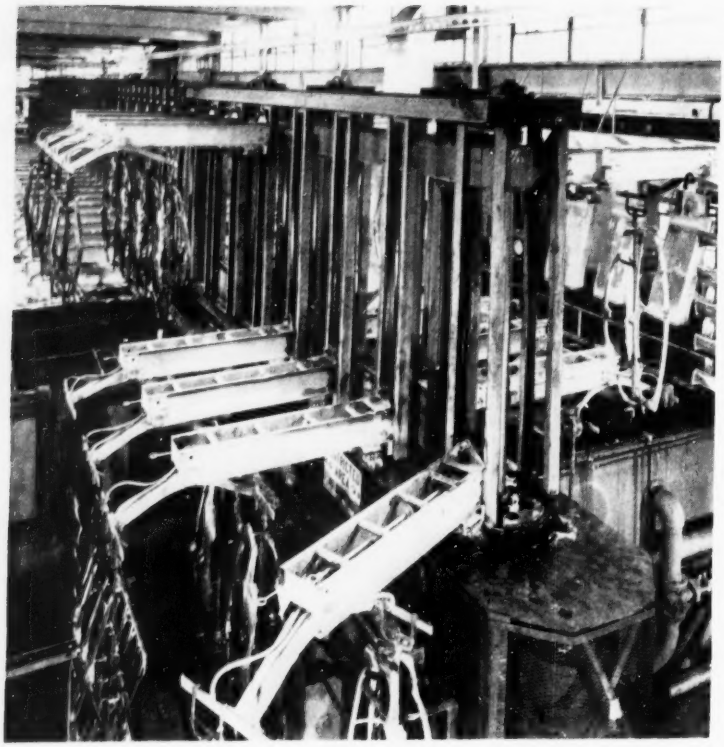
PUT IT ON HOT—The hot lacquer spray process is being used for the first time by the Armed Forces. Aircraft exteriors are painted by the hot method at the Naval Air Station, Jacksonville, Fla. The process incorporates a steam heating unit located about 30 inches from the paint gun which sprays the lacquer topcoat at 160°F. Auto industry also is giving a lot of attention to hot spraying.

CREVICE CORROSION— Year's study by Handy & Harman, New York, shows that tap water or highly humid atmospheres corrode steel interface of brazed joints. Their work dealt with straight chromium stainless steels brazed with nickel-free brazing alloys. Corrosion resistance is improved by using brazing alloys containing nickel.

SAVES ON SIZE— Overdesign for structural stresses can be avoided by employing the photoelastic technique to pinpoint potential failure points, Franklin Institute, Philadelphia, reports. Model or part of structure in question is put under a simulated load and subjected to parallel rays of polarized light emitted from a Polariscope. Visible light and dark patterns in transparent model indicate stresses.

DOUBLE UP— Carbon and sulphur contents of ferrous base alloys can be determined in a single operation using a procedure introduced by Lindberg Engineering Co.'s Laboratory Division, Chicago. Method uses high frequency combustion unit to heat specimens by induction to temperatures above 3000°F. Heat required is generated in sample only.

Metalworking Outlook—p. 35 *Market Outlook—p. 151*



This Doehler-Jarvis line plates large zinc base die castings for automotive use. Autos often have 50 to 100 square feet of plated work

What To Plate

Available nickel is being stretched and substitute finishes such as copper-chromium, zinc, and white brass are used to keep bright work on metal products

DR. ALLEN G. GRAY
Technical Editor

KEYSTONE of bright work on metal products is the nickel plate. Between the end of World War II and the Korean emergency, the use of bright nickel-chrome finishes reached unprecedented levels. Then the ax fell. Nickel restrictions sent manufacturers scurrying for substitute finishes to keep the gleam on products rolling from their assembly lines.

In the consumer goods field, available nickel is being stretched by plating thinner coatings, where permitted, with heavier copper under the nickel to compensate. It is the general opinion that a good substitute has not been found for nickel for outdoor or similar corrosive exposure.

Copper Sub—The substitute plating method being most widely used is chromium over copper plate, either direct or with a bare minimum of nickel to help the color and improve the covering power of the chromium. Chief advantage: A minimum of changes in equipment is required; and as nickel loosens up, it can be worked into the process with a minimum of lost production time.

Zinc plate with chromate dip and bright white brass, chromium plated, are also used in some applications where nickel-chromium was formerly employed. The addition of a baked clear enamel to the copper-chromium and other substitute finishes is specified for out-of-doors use by many manufacturers.

More Than Ever — Even with shortage of nickel, a greater volume of plated work is being turned out today than ever before. If activity in the plating equipment end of the business is a barometer, there is good evidence that manufacturers are planning on more bright work for future products to boost sales appeal of their wares in the coming era of stiffer competition for the consumer's dollar.

This month platers are getting 35 per cent of the nickel that was normal for operations during their base period for allowed uses and 25 per cent for strike uses. At the moment, the nickel supply outlook appears something like this: Monthly allocations in the third quarter are expected to be at least equal to those in the first quarter, thus eliminating the cutback of the second quarter. Nickel from DMPA contracts is just beginning to come in but the flow will grow steadily from here on in. The amount of nickel available for plating will surely improve. Some change for the better is expected as early as the fourth quarter of this year. And the first quarter 1954 will be still better, barring unforeseen military changes.

Not Much Time — When the squeeze was put on, nickel decisions

had to be made in a hurry. Hit particularly hard were manufacturers using the nickel-chromium sequence without copper plating facilities. Practically the only alternative here was thinner nickel coatings without major engineering changes. Cost of conversion is the main reason why nickel-chrome coatings are plated today. New equipment and increased space cost money. Manufacturers have put off changing to substitute finishes in the hope that nickel will become more available.

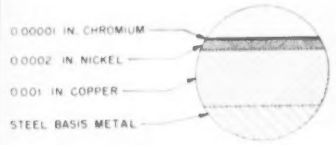
Here's how the Daystrom Corp., a large producer of nickel-chrome plated furniture, made the change to a copper plate - nickel flash-chrome finish. At their Olean, N. Y., plant, nickel plating took place in a 40,000 gallon plating machine designed by Hanson-Van Winkle-Munning Co. Chromium plating was done in a second machine. Since copper plating required a smaller bath than the nickel for equal thickness of plate, the copper nickel flash and chromium plating operations were placed in the large plating line after breaking it up for the different steps.

Conversion — The new bright plating operation takes place in the original 285-foot racetrack-shaped plating line used for nickel. Furniture parts connected to carrier arms are first cleaned, then plated with copper, kissed with nickel, and finally plated with chromium. Copper is plated for about 14 minutes using the Wes-X copper bath. The nickel flash takes 42 seconds. Chromium plating takes about 3 minutes. With the new line, over 100,000 linear feet of tubing for furniture can be plated a day.

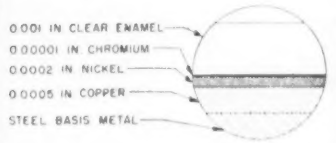
Under their present set up, Daystrom is plating 0.00075 inch of copper, 50 millionths of an inch of nickel and 30 millionths of an inch of chromium. Operations have been so satisfactory for the past two years that management doubts whether they will ever go back to full nickel plating. The feeling now is that when the shortage eases they will probably put a nickel coating—maybe up to 0.0003 inch—on top of the copper.

Over-all chemical costs with the new operation have stayed about the same. Labor costs have dropped. The copper-nickel flash-chrome operation takes place in one machine, requiring four operators. In the nickel-chrome opera-

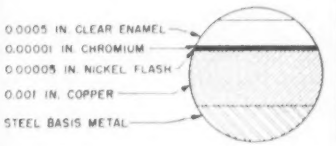
HOW TO LIVE WITH THE NICKEL SHORTAGE



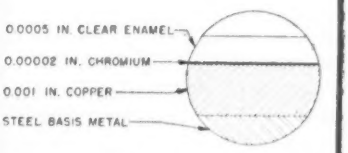
Copper Substituted for Two-Thirds of Nickel



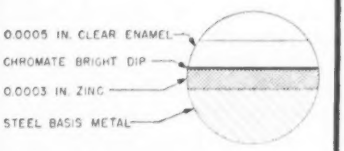
Medium Copper with Thin Nickel With or Without Clear Enamel



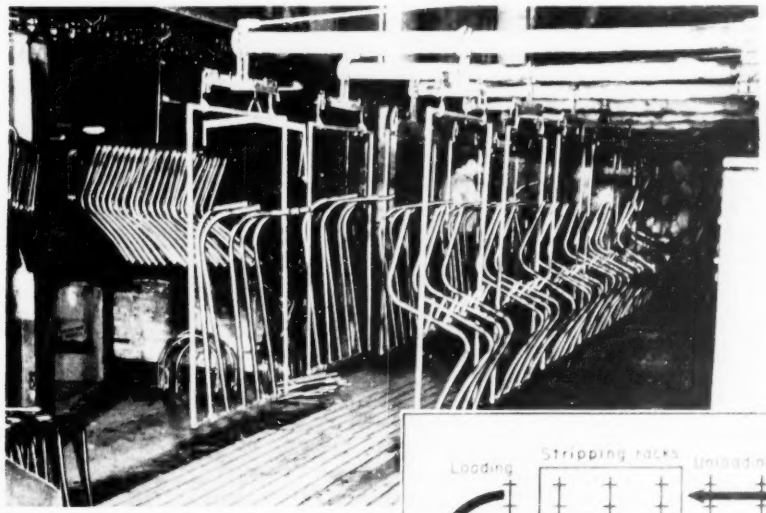
Heavy Copper, With Nickel Flash With or Without Clear Enamel

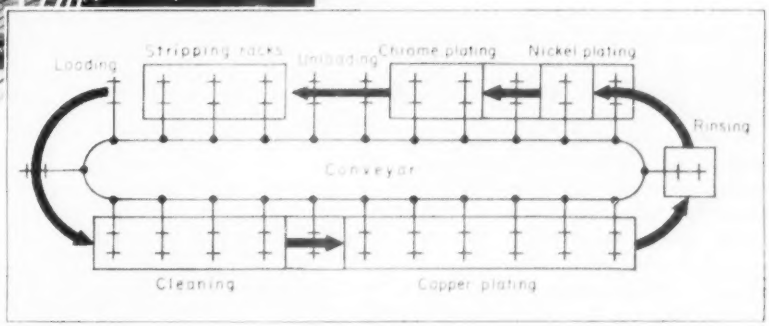


Copper Followed by Chromium and Clear Enamel

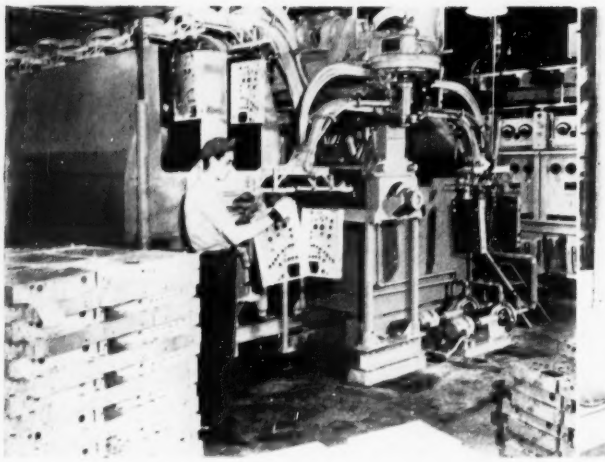


Zinc Plate Followed by Chromate Bright Dip and Clear Enamel

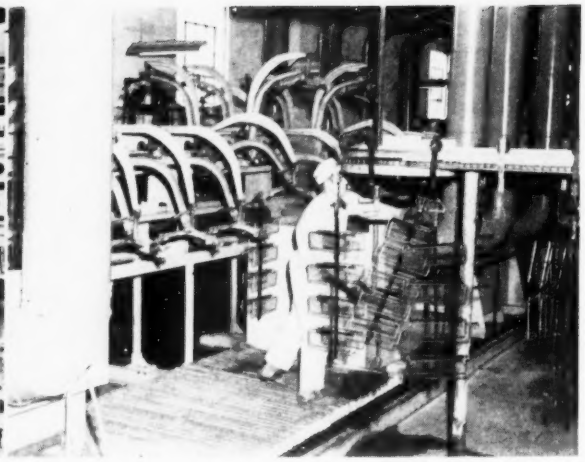




Daystrom Corp., Olean, N.Y., converted 40,000-gallon Hanson-Van Winkle-Munning automatic nickel plating unit into a line for plating 0.00075 inch of copper, 0.00005 inch nickel and 0.00003 inch chromium. Sixty different furniture parts — 100,000 lineal feet of tubing — are plated daily



This Udylite automatic plating unit typifies the high degree of engineering inherent in modern plating equipment. Conversion to substitute finishes can be expensive



Loading station at United Steel and Wire Co. where refrigerator shelves are zinc plated and given a Unichrome bright chromate dip followed by a clear lacquer coating

tion there were two machines; eight men were required.

Help Here—Where nickel-chromium finishes are still holding out, modification of parts to minimize deep recesses will improve corrosion resistance by increasing the minimum thickness of the nickel deposit. Auxiliary anodes may also be used to improve the metal distribution in recessed areas; however, most platers think this brings on a lot of trouble, productionwise. Nonetheless, it will pay to investigate all conditions affecting uniformity of deposit. Another suggestion: The use of bright nickel plate avoids the removal of deposited metal by buffing operations.

More Copper — Manufacturers using the established copper-nickel-chromium finish have in general met the emergency by plating less nickel and more copper on parts where permitted. A specification used for chromium plated steel parts for outdoor use is 0.0007 inch copper, 0.0006 inch nickel and 0.00010 inch chromium. To meet the shortage here platers are using around 0.001 inch of copper and 0.0002 to 0.0003 inch of nickel followed by chromium.

For some parts a maximum of 0.00005 inch of nickel is permitted. Sometimes this thin nickel flash is used to eliminate the need for coloring the copper plate for the straight copper - chromium sequence. Flash-nickel coatings are useful in chromium plating irregularly shaped pieces where the resultant improvement in throwing power of the chromium is an important factor. There is also a feeling that the flash nickel over copper gives a better appearance to the final plate on some parts. Flash nickel on copper is being used a great deal for decorative nonfunctional applications on appliances, tubular furniture, inside auto trim, and other indoor applications.

No Nickel — Copper-chromium coatings with or without clear baked enamels, are taking over for many applications. The use of a clear baked enamel on the copper-chromium plate is needed for outdoor use but is being less frequently specified for indoor applications. Home appliances, tubular furniture and interior automobile trim are now extensively plated with copper-chromium. It's a good idea to check the thickness of chromium on copper if the same cycle is being used as was employed for plating chromium over bright nickel. Some platers have reported that it is necessary to use a slightly longer plating time to get the same thickness of chromium over copper as compared with chromium over nickel.

General Motors specification 4370-M, covering copper-chromium finishes, was revised in July, 1952. Typical of the requirements set-forth for steel are 0.0003 inch of copper, followed by 0.00001 inch of chromium and 0.001 inch of clear baked enamel for interior parts. Five ten-thousandths of an inch of

GM SPECIFICATION FOR COPPER-CHROMIUM ENAMEL FINISH

Base Metal	Code	Copper Thickness Inches-Min.	Chromium Thickness Inches-Min.	Enamel Thickness Inches-Min.
Zinc base	30	0.0003	0.000010	0.0004
Die castings	30B	0.0003	0.000010	0.001
	50	0.0005	0.000010	0.001
Steel	30	0.0003	0.000010	0.0004
	30B	0.0003	0.000010	0.001
	50	0.0005	0.000010	0.001
	80	0.0008	0.000010	0.001

Code 30 finish is intended for general interior use.
Code 30B for interior parts subject to frequent handling (wear).
Code 50 for exterior use.
Code 80 for exterior use on vulnerable parts exposed to action of gravel.

copper is specified for exterior use and 0.0008 inch for exterior parts vulnerable to action of gravel.

Test—Copper-chromium finishes are required to withstand exposure in a humidity cabinet at 100 per cent relative humidity and 100° F for 96 hours without blistering or clouding. Those having a minimum clear enamel thickness of 0.001 inch must withstand 96 hours of salt spray testing without visible rusting or other corrosion of the metal underlying the clear enamel.

Need for acceptable methods of putting chromium directly on copper has resulted in improvements in deposition rate, brightness and smoothness in cyanide copper plating.

Some factors contributing to these improvements: New addition agents; better bath formulations; diaphragm tanks; and application of periodic reverse current. These improvements, of great importance during the nickel shortage, will undoubtedly contribute to more extensive use of copper plating on a permanent basis.

Bright Zinc — Chromium-bright zinc finishes are being used in a number of applications. General procedure is this: First a plate of 0.0002 to 0.0005 inch of zinc is applied. Then a quick dip in a chromate-type solution for better corrosion resistance and high brilliance. If needed, a clear enamel may be applied to seal in the bright finish against handling and exposure.

Improved chromate treating methods along with the shortage of nickel have been a big factor in the increased use of zinc as a finish in the last few years. They give zinc the extra protection against corrosion required by many specifications. They improve the brightness of the plate and provide a base for better lacquer adhesion.

Not New — Experience gained during World War II in finding a substitute for scarce tin and nickel that were previously used for plating refrigerator racks has been a great help in solving today's finishing problems. After the war, many manufacturers continued to use the lower cost chromated zinc finish plus a clear baked enamel on refrigerator racks even after nickel became available.

This zinc finish is also used in

HERE'S WHAT SOME MANUFACTURERS ARE PLATING TO GET AROUND THE NICKEL SHORTAGE

Part	Finish Pre-Korea	Finish Used Last Year
Waffle iron base	Nickel—0.001-inch Chromium—0.000020-inch	Copper—0.0008-inch Chromium—0.000020-inch
Waffle iron cover	Nickel—0.001-inch Chromium—0.000020-inch	Copper—0.0008-inch Chromium—0.000020-inch
Toasters	Nickel—0.001-inch Chromium—0.000020-inch	Nickel—0.0008-inch Chromium—0.000020-inch
Sandwich grill cover	Nickel—0.001-inch Chromium—0.000020-inch	Nickel—0.0008-inch Chromium—0.000020-inch
Sandwich grill base	Nickel—0.001-inch Chromium—0.000020-inch	Nickel—0.0004-inch Chromium—0.000020-inch
Refrigerator trim	Copper flash Nickel—0.0002-inch Chromium—0.000020-inch	Copper—0.0005-inch Chromium—0.000020-inch
Range trim	Nickel—0.0003-inch Chromium—0.000020-inch	Copper—0.0008-inch Chromium—0.000020-inch
Automatic washer doors	Copper—0.0015-inch Nickel—0.001-inch Chromium—0.000020-inch	Copper—0.0015-inch Nickel—0.0007-inch Chromium—0.000020-inch
Fan accessories Guards Screens Screen rings Couplings	Copper—0.0003-inch Nickel—0.0004-inch (Alt.) Copper plus nickel—0.001-inch Chromium—0.000020-inch	Bright zinc plus clear chromate dip plus baked clear enamel
Vacuum cleaner bright accessories	Copper—0.0003-inch Nickel—0.0004-inch (Alt.) Copper plus Nickel—0.001-inch Chromium—0.000020-inch	Bright zinc plus clear chromate dip plus baked clear enamel Die castings—0.000020-inch chromium direct
Milk cooler	Copper—0.0003-inch Nickel—0.0004-inch (Alt.) Copper plus Nickel—0.001-inch	Chromium—0.000020-inch direct on die castings
Water containers shells and heads	Copper—0.0003-inch Nickel—0.0004-inch (Alt.) Copper plus Nickel—0.001-inch	Tin—0.0005-inch
X-ray hardware Steel nuts and bolts	Nickel—0.0002-inch Chromium—0.000020-inch	Zinc—0.0005-inch plus chromate dip
Miscellaneous X-ray parts	Nickel—0.0002 to 0.0005-inch	Zinc—0.0002 to 0.0005-inch plus chromate dip
Bathroom fixtures	Copper—0.0004-inch Nickel—0.0005-inch Chromium—0.000010-inch	Copper—0.0005-inch Nickel—0.0002-inch Chromium—0.000010-inch
Tubular furniture	Nickel—0.0005-inch Chromium—0.000010-inch	Copper—0.0007-inch Nickel—0.00005-inch Chromium—0.000010-inch
Control equipment	Copper—0.0003-inch Nickel—0.0003-inch	Zinc—0.0003 to 0.0005-inch
Zinc die cast parts for breakers	Copper—0.0003-inch Nickel—0.0003-inch Chromium—0.000010-inch	Copper—0.0007-inch Chromium—0.000010-inch
Automotive bumpers	Nickel—0.0015-inch Chromium—0.000010-inch Copper—0.0005-inch Nickel—0.001-inch Chromium—0.000010-inch	Copper—0.001-inch Nickel—0.0005-inch (av) Chromium—0.000010-inch Copper—0.0014-inch Nickel—0.0006-inch (av) Chromium—0.000010-inch
Bumper guards	Nickel—0.0015-inch Chromium—0.000010-inch	Copper—0.0007-inch Nickel—0.0003-inch Chromium—0.000010-inch
Automotive zinc die castings—Non-functional Radio grills Moldings Hood ornaments	Copper—0.0005-inch for exterior use Copper—0.0003-inch for interior use Nickel—0.0005-inch Chromium—0.000010-inch	Copper—0.0005-inch Chromium—0.000010-inch baked clear enamel
Functional Wiper Door handles Locks	Copper—0.0004-inch Nickel—0.0005-inch Chromium—0.000010-inch	Copper—0.0005-inch Nickel—0.0002 to 0.0003-inch Chromium—0.000010-inch
Steel hub caps	Nickel—0.001-inch Chromium—0.000010-inch	Copper—0.0009-inch Chromium—0.000010-inch Baked clear enamel
Barrel plated screws, bolts and washers	Copper plus nickel 0.0003 to 0.001-inch Chromium—0.000010-inch	Bright white brass 0.0003 to 0.0005-inch Chromium—0.000010-inch

Adapted in part from data presented by Myron Ceresa, Westinghouse Electric Corp., at 39th meeting of American Electroplaters' Society.

A variety of substitute finishes is in the research or experimental stage. Copper-tin and nickel-tin alloys are giving promising corrosion results

the appliance and automotive fields. The color, although brilliant when properly applied, is slightly different from the color of chromium plate.

A number of products have components with a zinc finish of this type—stove and refrigerator parts, hospital beds, ice skates, fan guards, business machine parts, bicycle rims and the like. One auto specification requires that the zinc plated chromate treated parts, without supplementary organic coating, stand up for 72 hours in salt spray without formation of white corrosion products.

Bright White Brass — This is probably the most talked about and one of the least used of the major substitute finishes for nickel. The plate consists of an alloy containing 70 to 90 per cent zinc and the remainder copper. The plated alloy has been known for a number of years. However, it is only recently that methods have been developed for producing a bright deposit.

Electroplaters will tell you that from the standpoint of bath operation, alloy plating processes usually present more difficulties than those used for plating a single metal.

However, surprisingly few difficulties are encountered in producing white brass coatings if proper control measures are exercised. The bright deposit can be readily chromium plated. It takes a real expert to distinguish it from chromium-plated bright nickel.

Here's the Catch — Appearance of the plate is only one requirement that must be met for a satisfactory finish. Permanence and physical properties of the deposit are just as important. Here's where white brass falls down. The deposit is rather highly stressed and is quite brittle. Because of this it is not practical to deposit coatings much over 0.0003 inch. Chromium plating aggravates the stressed condition of the deposit in proportion to the thickness of chromium plate.

White corrosion products typical of zinc appear in a few weeks when plated parts are exposed to weathering. A durable clear enamel is required for outside exposure. This brings on more problems: The most durable coatings are cured by baking and such elevated temperatures as are needed encourage stress cracking of chromium plated white brass.

Advantages—The color of the white brass finish, its throwing power, and ability of chromium to cover it on irregularly shaped articles are real advantages. If research can overcome the difficulties now being encountered, the finish may attain wide use, perhaps even when nickel troubles are eased.

Experimental work is being done with deposits higher in copper to reduce the brittleness of the plate and minimize formation of white corrosion products. In plating of certain shapes of zinc die castings, white brass has an advantage over bright nickel. It solves the problem of contamination of the nickel solution with zinc from unprotected internal surfaces of the castings.

There are a number of applications involving mild exposure for which chromium plated white brass may be satisfactory. Here are a few prospective uses suggested by Dr. R. B. Saltonstall, Udylite Corp., Detroit: Bicycle parts, toys, tools, metal furniture, novelties, interior automotive hardware and trim, picture frames, luggage hardware, bells, casket hardware, screws, handbag frames, electrical fixtures, vending machine trim and buckles. Small parts such as screws and washers formerly nickel-chromium barrel plated are being successfully white brass-chromium plated.

Test—General Motors specification 4390-M covers white brass plating of small standard parts for interior use. White brass plate must range in thickness from 0.0002 inch minimum to 0.0003 inch maximum. Chromium is deposited to a minimum thickness of 1 millionth of an inch. The finish must withstand 16 hours of salt spray exposure without evidence of base metal or white corrosion products. White brass has not found general acceptance in the automotive field up to now. There is recent evidence that some auto makers are taking another serious look at it.

A variety of substitute finishes can be tagged as being in the research or experimental stage. They may be important for future use but are of little or no benefit at the present time to manufacturers

(Continued on p. 96)

New Thompson AUTOMATIC double wheel TRUFORM Grinder speeds jet engine production

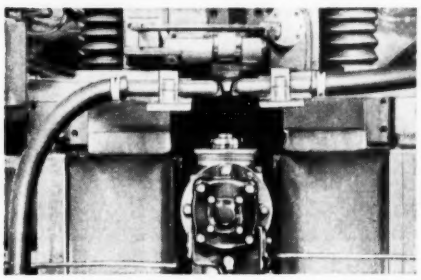
GRINDS BOTH SIDES OF JET TURBINE BUCKETS OR BLADES SIMULTANEOUSLY IN A SINGLE SETTING

To grind root sections on gas turbine buckets with greatest accuracy and productivity, Thompson developed this new AUTOMATIC double wheel TRUFORMING machine featuring simultaneous grinding of both sides of root section with one setting of work.

Grinds rough to finish in 110 seconds . . . or 30 buckets per hour

Hood doors, work clamps, coolant flow, grinding and crushing cycles are actuated in automatic sequence on the new Thompson AUTOMATIC double wheel TRUFORM Grinder.

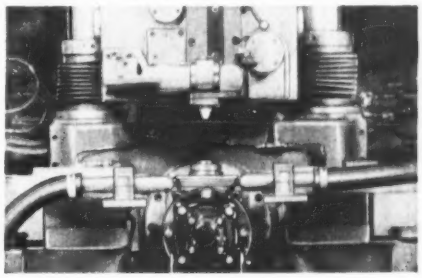
On a bucket having 2" length of form similar in design to the one in the diagram above with .150" stock removal per side from rough to finish size, production is 30 buckets per hour at a steady day after day rate. This includes down time for dressing, regrinding the crusher roll, initial machine warm up period, wheel changing and diamond changing. Actual machine time from rough forging or casting to finish is 104 seconds plus 6 seconds for loading and unloading time . . . makes total time floor to floor 110 seconds per piece.



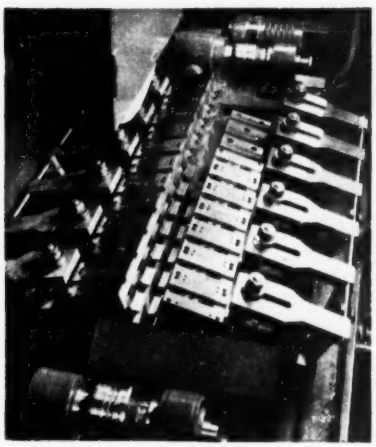
FOR ABSOLUTE SYMMETRY BOTH WHEELS ARE DRESSED FROM A SINGLE CRUSHER ROLL

GRINDING POSITION

CRUSHING POSITION

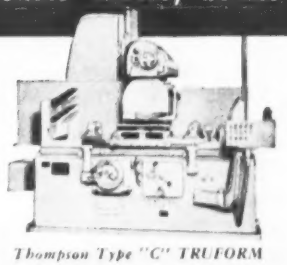


Standard THOMPSON TRUFORM Machines also grind jet buckets faster, better



By means of multiple grinding of jet turbine buckets the standard TRUFORM Grinders still offer high production plus many advantages such as flexibility of standard machine design and lower first cost. Although compared to the new AUTOMATIC the standard TRUFORM requires more skillful set up and tooling.

Typical tooling on Type "C" TRUFORM producing 24 buckets per hour. Type "B" TRUFORM produces 18 parts per hour.



Thompson Type "C" TRUFORM

FOR COMPLETE DETAILS WRITE TODAY

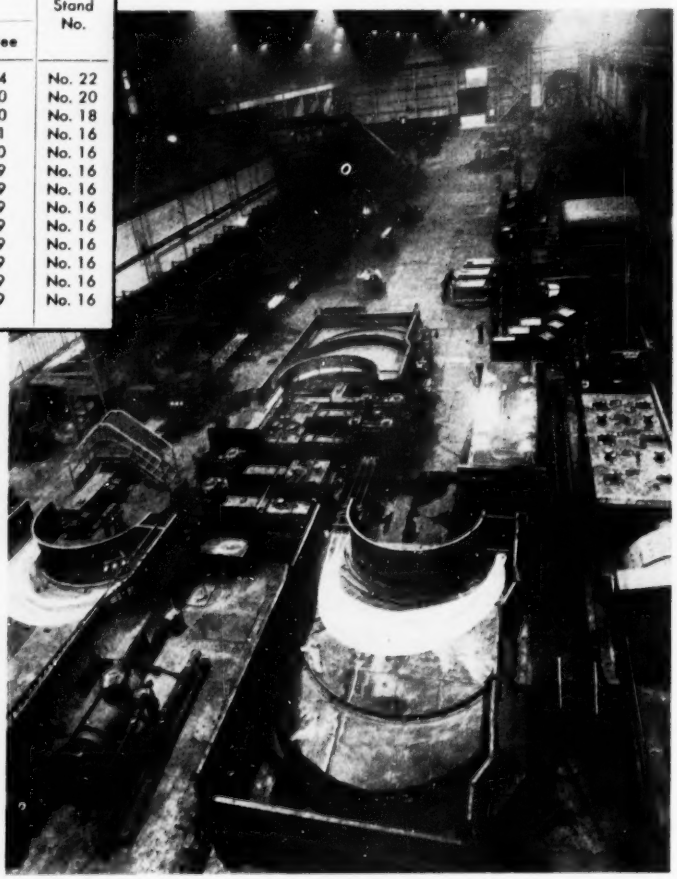
The Thompson Grinder Co.
Springfield, Ohio

Thompson SURFACE Grinders

TENTATIVE SCHEDULE OF SPEEDS AND PRODUCTION FOR TYPICAL ROD SIZES

Length of Rod	Size of Rod	Weight Lbs./Ft.	Fin. Speed Ft./Min.	Tons per Hour			Roll Stand No.
				Bars in Mill			
				One	Two	Three	
4700	.218	.128	4750	18	36	54	No. 22
3600	¼	.167	4000	20	40	60	No. 20
2400	5/16	.261	3000	24	48	70	No. 18
1600	3/8	.375	2400	27	54	81	No. 16
	13/32	.440	2300	30	60	90	No. 16
1200	7/16	.511	2200	33	66	99	No. 16
	15/32	.587	1900	33	66	99	No. 16
900	½	.668	1650	33	66	99	No. 16
	17/32	.754	1450	33	66	99	No. 16
710	9/16	.845	1320	33	66	99	No. 16
	19/32	.941	1200	33	66	99	No. 16
600	5/8	1.04	1100	33	66	99	No. 16
	21/32	1.15	1000	33	66	99	No. 16

J & L mill literally "turns out" rods at nearly 60 mph. On some sizes, three 180-degree turns are made in the intermediate mill. Turns make for unit compactness and saving of space



Rod Mill Combines High Speed Top Quality

Fundamental mill components reorganized to do job of what is essentially a three-strand unit. Three turns in line conserve space

ONE continuous rod mill "tailored" to approximate the production of three single-strand mills hurries out plus-quality steel rods at nearly a mile a minute in Jones & Laughlin Steel Corp.'s Aliquippa, Pa., works.

Designers of the speed demon, United Engineering & Foundry Co., Pittsburgh, accomplished the feat by converting fundamental components of a rod mill into what is essentially a three-strand mill.

Compactness and space savings were realized by shortening the line with three 180-degree turnabouts from the roughing stands and in the intermediate train. Added feature is that the arrangement positions the operator close to all components of the operation.

Statistics—Mill's capacity is currently rated at 26,000 tons a month by J & L. Needing only 35 men for each turn, it is capable of the industry's fastest production rate.

Take May, for instance. Production averaged 310 tons a turn. If 12 turns had not been missed, the end of the month total would have stood at 27,400 tons. One crew, working with 0.218-inch rod, hit a high of 372 tons in an 8-hour shift. During the month, 86.4 per cent of rod handled was under ⅜ inch.

Discriminating — But the mill doesn't sacrifice quality for quantity. Time was when rod mill output went principally into nails, farm wire, staples and such. Today's usages, including cold forging steel, valve spring wire and mechanical wire, call for close size, seam and pitting requirements.

Rods turned out by the new mill combine high section accuracy with top surface quality. They are cold drawn into wire and converted into wire products at J & L's mills.

Specifications — Mill's three stands will roll 400, 500 or 600-pound billets into rods within the size range of 0.218 to 0.656 inch.

Starting with three 2½ x 2½ inch x 30-foot billets, for instance, it has delivered three 0.218-inch rods with lengths of 4728 feet each at a rate of 5000 fpm.

Work is done by 22 stands of rolls arranged in three divisions: Roughing and Intermediate trains with eight stands each and a six-stand finishing train. Stands are

What it takes to make a 3000 Degree Refractory Concrete

Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. *When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?*

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. *Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?*

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. *Then you have a grog, a binder and a method of putting them together. Which is most important?*

A. You can't say that any *one* is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. *And now, what about the binder?*

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the pre-firing of the binder to produce stable compounds.

Q. *Just how important is the manufacturing or "blending" of the grog and the binder?*

A. If one factor could be singled out as "most important" it would be quality control.

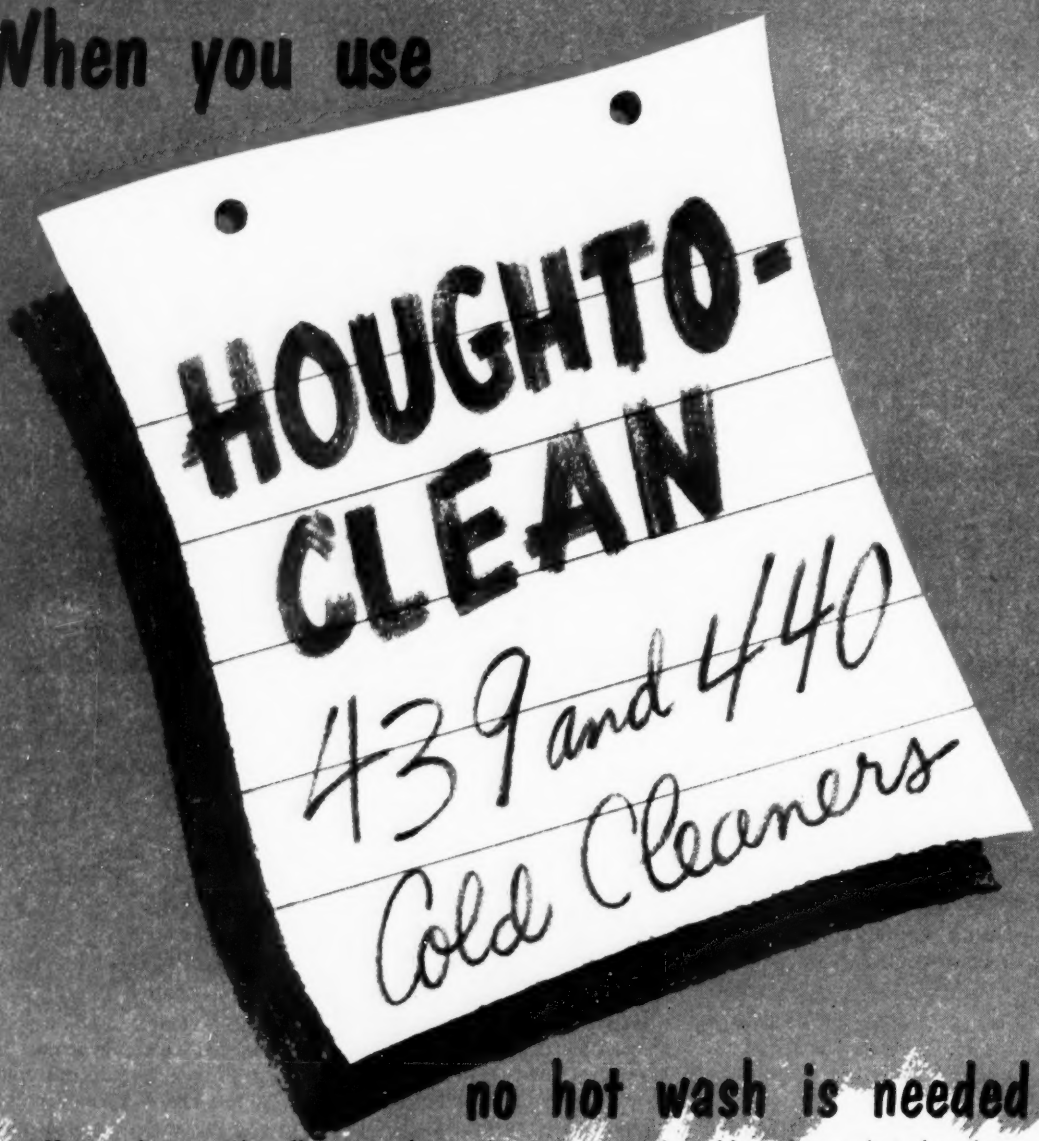
Direct control over the fineness of materials, prefiring temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. *These factors you've discussed must add up to some specific advantages of Kaocast. What are they?*

A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga.

When you use



no hot wash is needed!

Now . . . by using this efficient production line cleaning method we recently perfected . . . you can remove soils and oils in fewer washes *without* using a hot wash!

Houghto-Clean 439 and 440 supplement each other to provide a combination of alkali-solvent-wetting properties which make these cost-reducing benefits possible:

You need no stacks, vents, burners, heat controls . . . heating costs are eliminated (saving plenty!) . . . mixing is easy . . . parts are never too hot to handle . . . and absence of steam also adds to the comfort of workers.

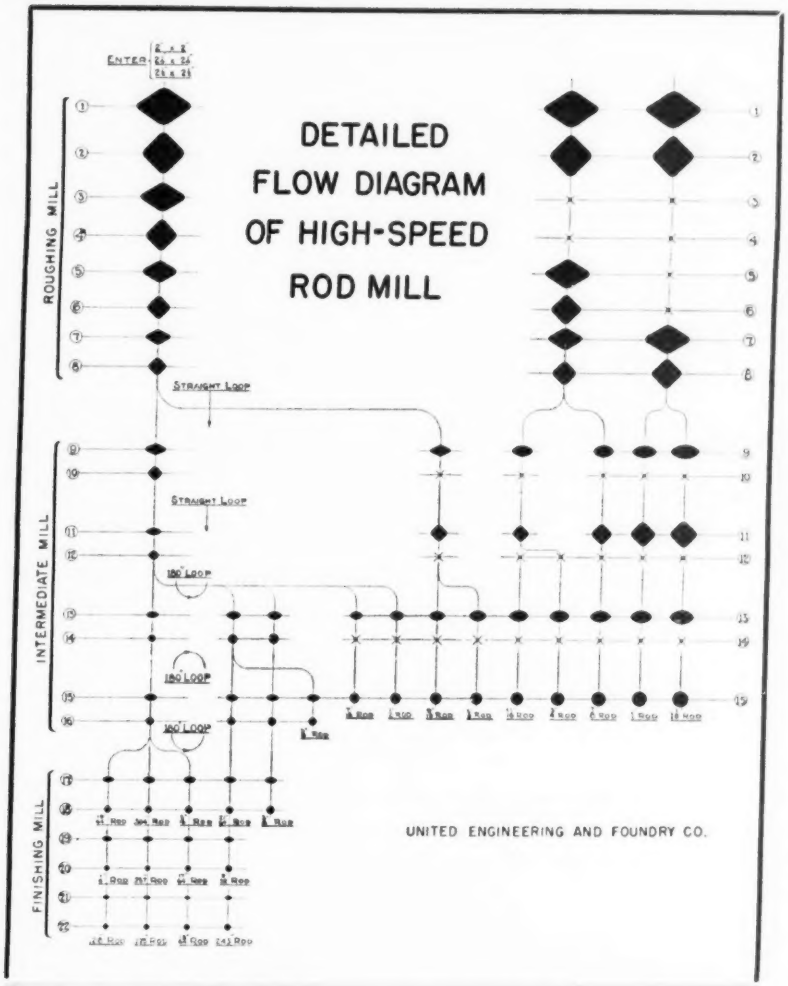
This new room-temperature cleaning combination guarantees exceptionally long solution life—and offers additional economy because the extra expense of heat is unnecessary. Write now for bulletin describing the Houghto-Clean 439 & 440 combination for room-temperature power washing. Try it on your production line.

E. F. Houghton & Co., Philadelphia 33, Pa.

HOUGHTO-CLEAN 439 & 440
—cold cleaners produced by

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .



Flow diagram also showing positioning of stands for rolling rod ranging from 0.218 to 1⅛ inches. Billets measuring 2, 2¼ or 2½ inches may be used, depending upon whether 400, 500 or 600-pound coils are wanted.

When rolling 2-inch billets, No. 1 stand is idle. No. 2 is used as pinch roll. Speed of both is increased when rolling 2¼-inch billets to compensate for difference in area. All these billets are rolled to 0.888-sq. in. out of No. 8 for rod sizes between 0.218 to 43/64-inches. Once roughing mill is set, adjustment for different rod sizes isn't necessary.

Sizes up to and including 11/32-inch are rolled with no roll changing in first 14 stands. Only changes are lead oval and finishing round rolls in No. 15 and 16 to roll ⅜-inch rod.

For sizes 7/16 and ½-inch, No. 14 and 16 are removed. Lead oval and finishing round rolls are placed in positions of No. 13 and 15. Square out of No. 12, regularly used for small rod line, is in position to take these sizes.

Square in No. 10, regularly used for small rod, is moved, stand and guides, to position No. 11, to make 9/16 and ⅝-inch rods.

More stock from roughing train is needed to make 11/16 to ⅞-inch rod. This is done by removing No. 7 and 8 and moving No. 3,4,5,6 to positions of No. 5,6,7,8. When rolling 1 to 1⅛-inch rod, No. 5,6,7,8 are removed. No. 3 and 4 are moved to positions of No. 7 and 8. Moving is done with minimum down time. Stands and guides are moved as one unit.

electrically driven. Different sizes are made up by changing the rolling-stand setup.

Specially-designed bundle busters cut down manual handling of billet bundles and regulate speed of billets entering the furnace.

Roughing Train — This unit is equipped with roller bearings. Stands No. 1 and 2 are 16-inch mills driven by a single dc motor. They serve to equalize areas of 2, 2¼ and 2½-inch billets at stand No. 3 in the ratio of speed x area = constant.

Stands No. 3 to 8 are 15-inch mills, driven by a separate dc motor for each pair of stands. Drive gear ratios are designed to permit moving of stands No. 4 and 6 to No. 8 position when rolling a particular range of large rod sizes.

No excessive pass reductions are employed and entering problems are averted. This is conducive to smoother mill operation, longer roll life and better surface quality.

Intermediate Train — All roll stands are equipped with roller and ball thrust bearings. As in the roughing train, they're arranged in pairs or as duo sets, with each pair driven by a dc motor. At least one stand of each pair is in operation for all sizes.

Arrangement provides four or five controlled loops, which permits holding to minimum tolerances without taper. Repeating of small ovals, always troublesome, is eliminated.

Finishing Train—This unit also has roller and ball thrust bearings. It's driven by a single dc motor.

Stand No. 22 has a speed of 4,750 fpm when rolling three 0.218-inch rods at the rate of 50 tons per hour.

The three strands, if finishing within the range of 0.359 to 0.656 inches, are coiled in six pouring reels; and if within the range of 0.218 to 0.359 inches, they are coiled in six laying reels. From this point, they proceed to proper conveyors for further processing.

Subject to mechanical limitations as to speed, the rate of production is always equal to the capacity of the furnace.

The new Rendleman rod mill went into production on Dec. 30, 1951. Its cost was about $11 million.

Eight aluminum or steel wheels are finished at a time. They're lowered into machine with overhead 1-ton hoist

Grinding chips are loaded into cylinder. Other ingredients are water and five pounds of No. 255 compound

Deburrer Beats Hand Method

Deburring job on compressor-rotor wheels for Allison jet engines took two hours per wheel by hand; new method performs same amount of work better in about eight minutes

COMPRESSOR-ROTOR wheels for Allison jet engines are now deburred in about one-fifteenth the former time with a tumbling installation. Wheels are processed eight at a time in a special dual-action Roto-Finish model DW 48-42.

Completed compressor assembly consists of 11 wheels in graduated diameters separated by spacer rings. Wheels No. 1 through 8 are aluminum, while wheels 9 through 11 are stainless steel. Job requires removal of burrs on the outside diameter of each slot and wheel ends.

Hours to Minutes—Before the changeover to the new process, hand-deburring methods took about two hours per wheel. Time has been cut on both AMS 5613 stainless steel and AMS 4135 aluminum wheels to about eight minutes per wheel. Beneficial cleaning action on the wheel surfaces and polishing of the four holes is an added bonus.

Using the hand method, burrs on the outside diameter were removed with a hand file. End burrs were removed by a power driven hand deburring tool. Ratio of manpower needed by the new method has been reduced 10 to 1.

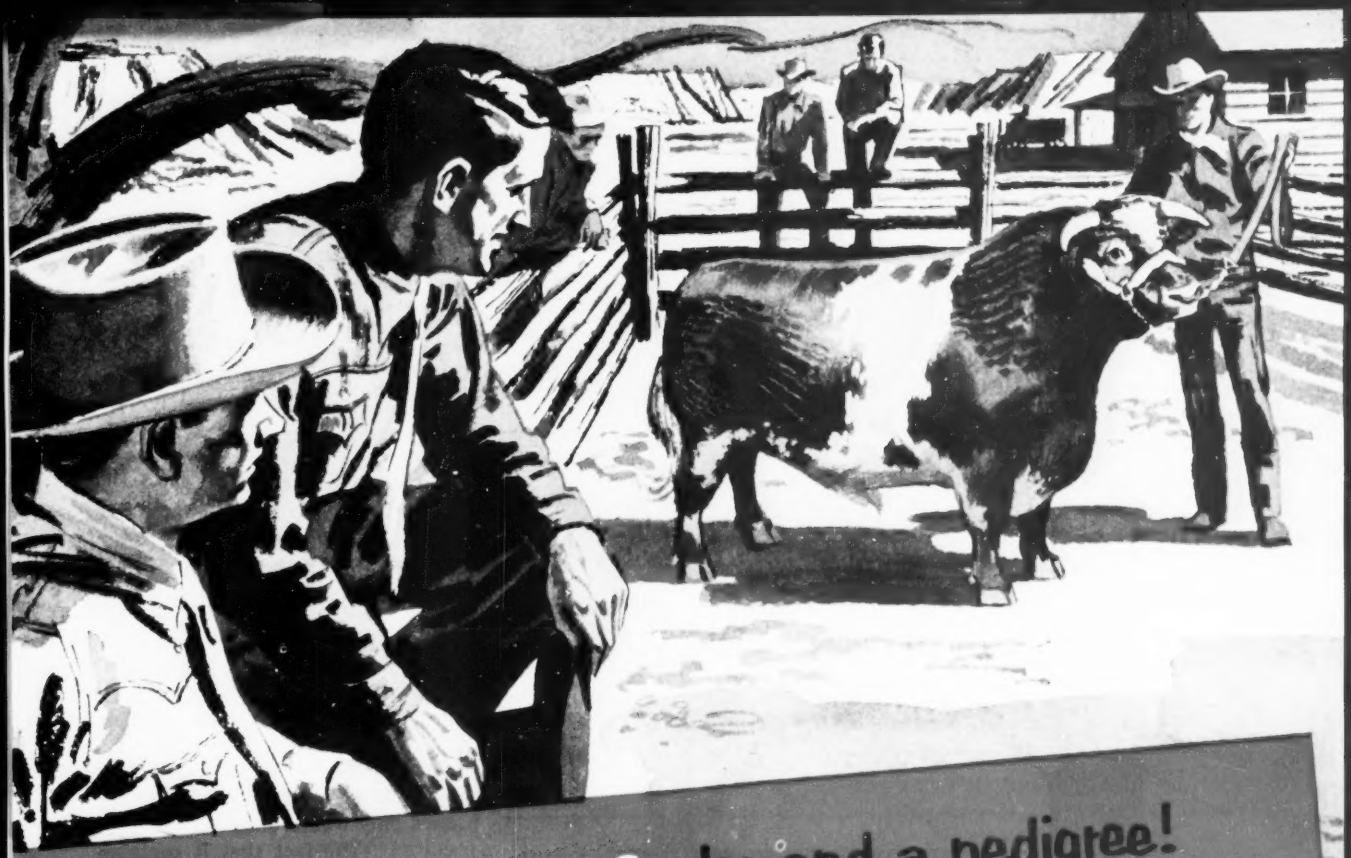
Eight at Time—Eight aluminum or steel wheels are finished at one time. They are mounted on a fixture shaft with bushings to keep them separated during the processing cycle. Machine operator picks up the fixtured wheels with a 1-ton hoist and places them in the cylinder. Roto-Finish No. 5B grinding chips are added from the hoist pan. One hundred pounds of chips lasts about a month of continuous operation.

Measured amount of water and five pounds of No. 255 compound are added to prevent glazing of the chips and to retard tarnish or corrosion of the finished wheels. Cover is hoisted and locked into position, guard gate closed and machine started by push-button.

Automatic — Machine is completely automatic. Cylinder rotates in a clockwise direction, while the fixtured wheels rotate in opposite direction. Every three minutes the direction of travel of both is reversed automatically.

Total time for deburring eight aluminum wheels is one hour. Total time for deburring eight steel wheels is one and three-quarter hours. One machine can produce enough wheels in one eight-hour shift to stay ahead of the production of rough parts in two eight-hour shifts.

Close Tolerances—No appreciable dimensional change takes place. Upon completion of the time cycle, the machine automatically shuts itself off. Cover is removed, water is drained, and enough chips dumped into the hoist pan to permit removal of finished wheels from the processing compartment. Wheels are then rinsed with clear water and transferred to the drying rack.



SMART RANCHERS demand a pedigree!

SMART HOB BUYERS DEMAND A CERTIFIED UNGROUND HOB!

The TOOLGRAPH* Chart which accompanies every Illinois Tool Works CERTIFIED Unground Hob is an electrically produced "certificate" of accuracy that shows the exact alignment of each hob tooth in relation to the other teeth. It's a positive, *visual* inspection record, not subject to human error and it's a useful record, too, that helps assure efficient production.

Yes, the TOOLGRAPH Chart is actually a CERTIFIED Unground Hob's pedigree, proof of real value. It's typical of the many *plus* values that design ingenuity, metallurgy, production skill and experience add to *every* Illinois Tool Works cutting tool.

Smart hob buyers, like smart ranchers, demand a pedigree. That's why they specify Illinois Tool Works CERTIFIED Unground Hobs!

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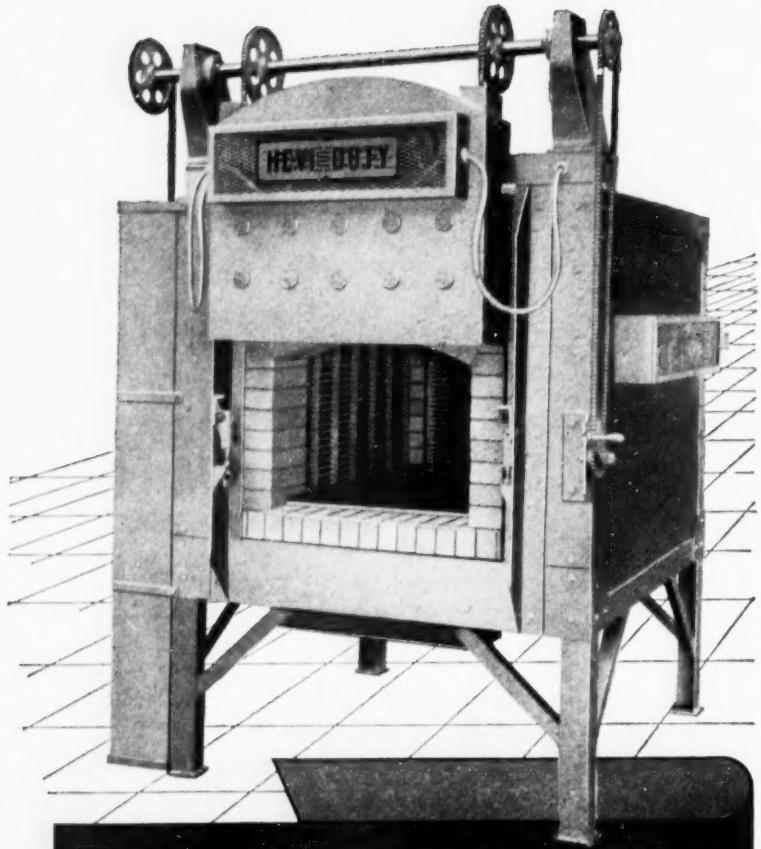
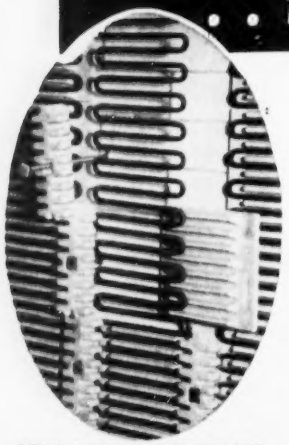


It's the RELIABILITY of HEVI DUTY Furnaces . . . that COUNTS



LONG HEATING ELEMENT LIFE
Round rod return bend heating elements are adequately supported by radiant plates of high grade refractory material.

ADVANCED design, rugged construction and high quality materials are combined with years of furnace building experience to produce Hevi Duty box furnaces. Round rod heating elements and sturdy radiant plate element supports assure continuous performance under severe operating conditions. Users report that reliability and trouble free service are outstanding advantages of Hevi Duty furnaces.

Write for Hevi Duty Bulletin No. HD441

HEVI DUTY ELECTRIC COMPANY
HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY
DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS
MILWAUKEE 1, WISCONSIN

WHAT TO PLATE . . .
(Continued from p. 88)

hard pressed to get out everyday production.

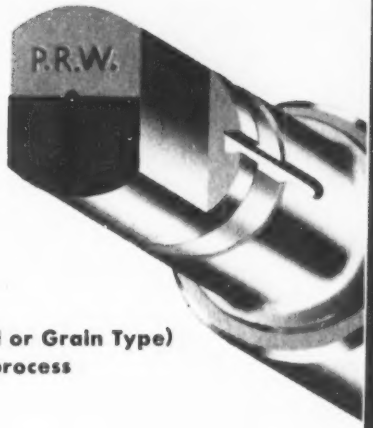
Tin Alloys — Several tin alloys look promising as a substitute for nickel. The copper-tin alloys, Speculum and Nickelex, are two at the top of the list. The Nickelex finish, which contains 90 per cent copper and 10 per cent tin, is readily chromium plated. The Speculum alloy, which contains 60 per cent copper and 40 per cent tin, generally requires a flash of nickel before chromium plating. There are reports floating around that these tin alloy deposits under chromium give corrosion resistance that is better than the same thickness of copper plate under chromium, but full details are not yet available.

A plated tin-nickel alloy containing 65 per cent tin and 35 per cent nickel gives indications of good corrosion resistance without chromium plating. However, it can be used only where nickel is now permitted. The fact that it contains only 35 per cent nickel means that heavier coatings could be used for more effective corrosion protection. Most serious drawbacks in its present state of development: Brittleness of the deposit and the need for mechanical finishing to get a bright deposit.

Some interest is being shown in electroplated nickel-iron alloys. Corrosion resistant requirements need an alloy with about 70 per cent nickel. This high nickel content dampens interest in the coating so long as nickel is tight.

Better Chromium — Promising possibilities seem to exist in applications where chromium is plated directly on steel in considerably greater thickness than is used with nickel-chromium finishes. At the American Electroplaters' Society Meeting last month, United Chromium, Inc., Detroit, presented corrosion data on a modified-chromium plating bath that gives a crack-free chromium plate. The deposit is softer than ordinary chromium plate which allows buffing to a high luster. Steel panels plated to 0.0003 inch chromium in the crack free bath lasted for 175 hours in the salt spray before corrosion, whereas ordinary chromium failed badly in 24 hours.

*PITTSBURGH GRADE ROLLS are color marked for specific uses in rolling . . .

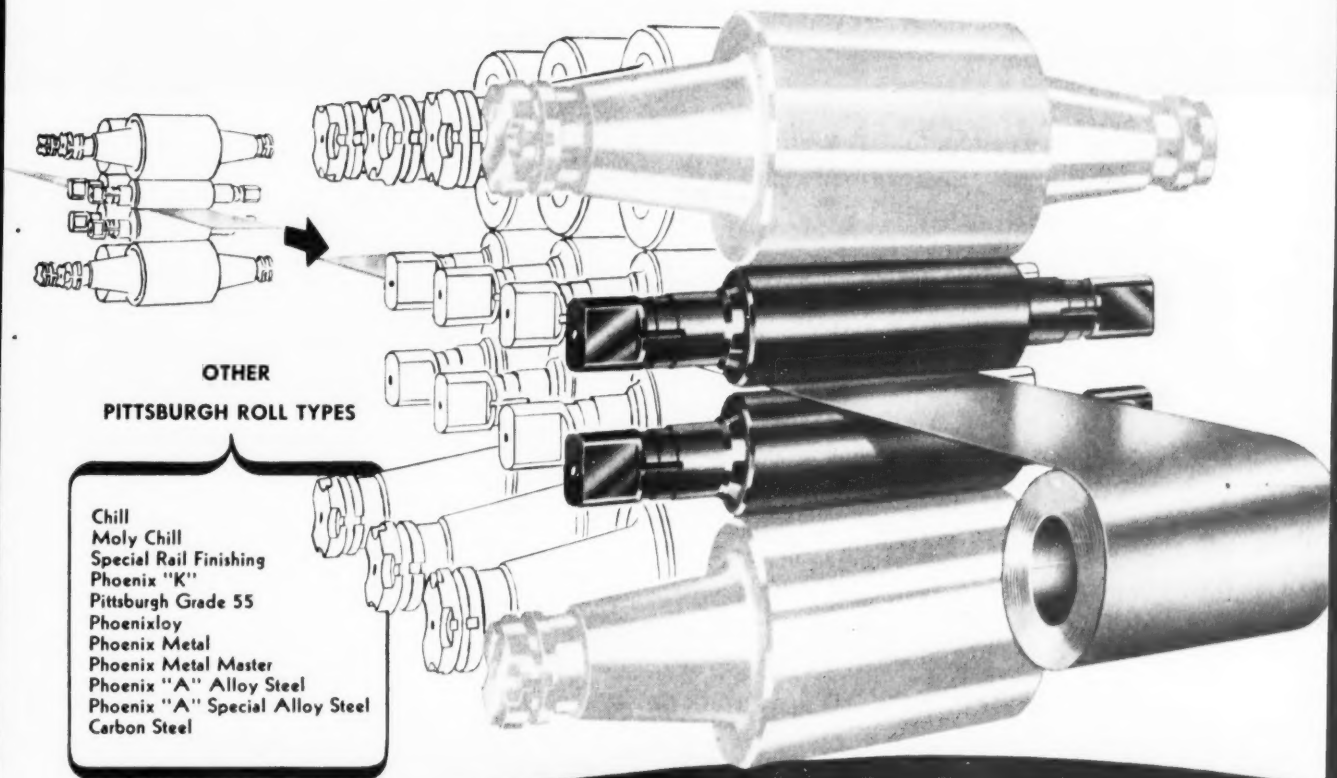


***NICKEL ALLOY IRON**

STRIP AND PLATE HOT MILL WORK ROLLS

FINISHING MILL STANDS (Chill or Grain Type)
- Pittsburgh Grade Special process
- Pittsburgh Grade 45
- Pittsburgh Grade 35
- Pittsburgh Grade 25

ROUGHING MILL STANDS (Grain Type)
- Pittsburgh Grade 35
- Pittsburgh Grade 25



OTHER PITTSBURGH ROLL TYPES

- Chill
- Moly Chill
- Special Rail Finishing
- Phoenix "K"
- Pittsburgh Grade 55
- Phoenixloy
- Phoenix Metal
- Phoenix Metal Master
- Phoenix "A" Alloy Steel
- Phoenix "A" Special Alloy Steel
- Carbon Steel

PITTSBURGH ROLLS

BLAW-KNOX COMPANY • PITTSBURGH ROLLS DEPARTMENT • PITTSBURGH, PA.

P.R.W.

Look to TW for sound, reliable assistance in RESISTANCE WELDING

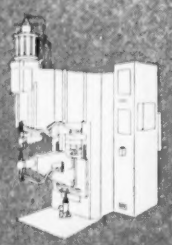
SPOT • PROJECTION
SEAM • FLASH-BUTT

WHEN designing new parts, resistance welding is the modern, economical production method. We can help you.

WHEN setting up a new production line, we can give you help with resistance welding's part in retooling.

WHEN resistance welding will improve your present setup — we have the answers.

WHEN you need practical help, we have application, design and field engineers available to give you facts, figures and the benefit of our 50 years of experience — 'phone or write your nearest district sales and service office.



Resistance Welders Since 1898

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TAYLOR-WINFIELD
RESISTANCE WELDERS

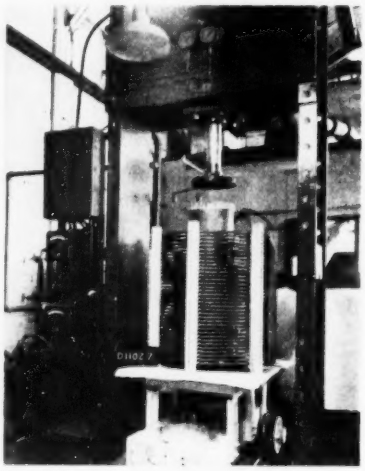
THE TAYLOR-WINFIELD CORPORATION • WARREN, OHIO

Furnaces for Hot Pressing

Techniques and equipment continue to grow under stimulus of sintered products

STUDY of most common types of commercial furnaces for hot pressing refractory materials at temperature ranges 2732 to 4712° F and pressure ranges 2000 to 10,000 psi has been made by J. A. Upper, research engineer, Norton Co., Chippawa, Ont.

Resistance heating, most prevalently used, is ideally suited for many applications, such as heating graphite tubes up to 6 inches OD x 60 inches long, with a wall thickness of ½ inch. Induction regulator has a continuously variable



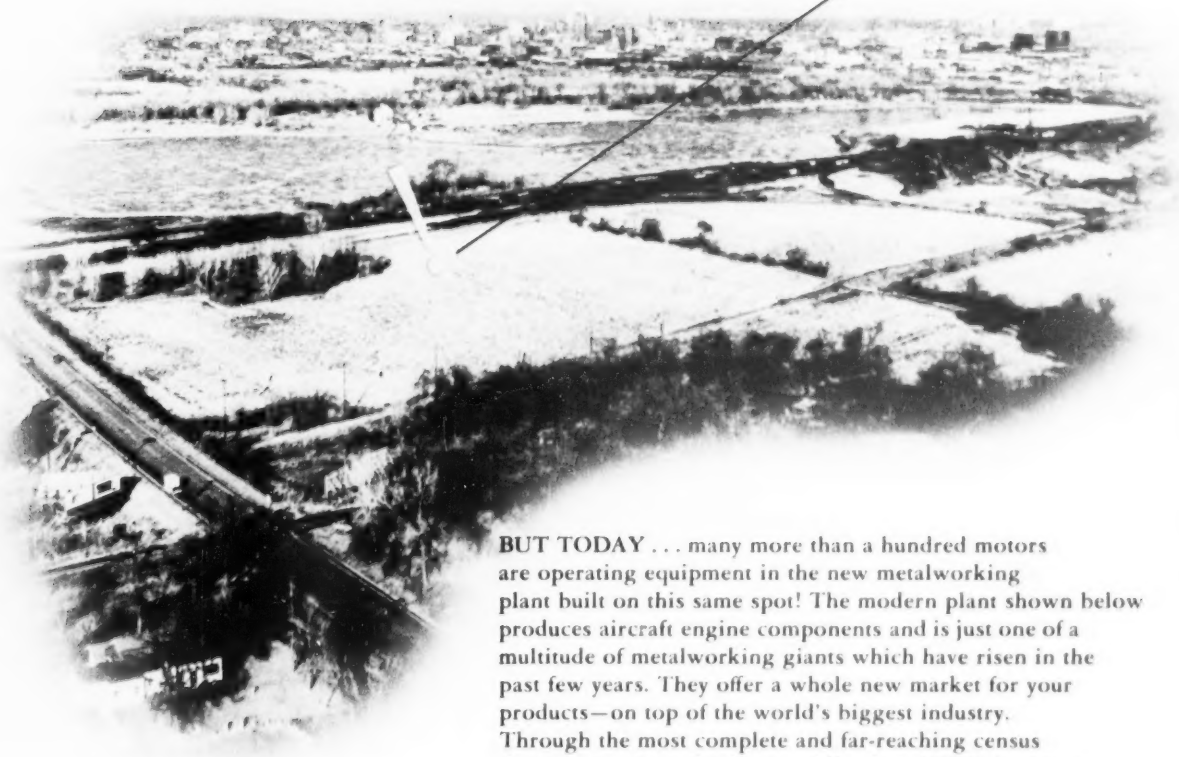
INDUCTION-HEATED PRESS FURNACE
. . . *design shows promise*

secondary output voltage going from 0 to 30 volts, with current carrying capacity of about 15,000 amps.

Induction heating ranks second. For small scale work up to 1 inch in diameter x 1 inch long, a 15 kva, 30,000 cycle power supply is adequate. To press larger pieces up to 14 inches in diameter x 10 inches long, about 300 kva at 1000 cycles is required.

Pressure Devices — Use of hydraulic or pneumatic rams is preferred. Pneumatic rams operated at 90 to 100 psi and equipped with pressure reducing and direction control valves provide the ultimate in adjustability and control. Hydraulic rams, often used for high-

You wouldn't expect to sell **100 electric motors** here



BUT TODAY . . . many more than a hundred motors are operating equipment in the new metalworking plant built on this same spot! The modern plant shown below produces aircraft engine components and is just one of a multitude of metalworking giants which have risen in the past few years. They offer a whole new market for your products—on top of the world's biggest industry.

Through the most complete and far-reaching census department of any business publication, STEEL is able to locate, measure and cover this new market as it grows.

And STEEL's controlled distribution makes it possible for you to reach the key men in these metalworking plants almost as soon as they open their first batch of mail.

Ask the man from STEEL to show you how this dynamic magazine matches its circulation to Metalworking's buying power *as it expands* over the years.

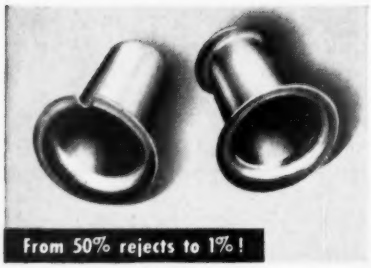
The magazine of the men who

manage, operate and buy for the

Metalworking industry . . .

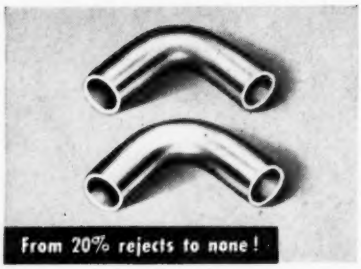
The new Des Moines plant of Solar Aircraft Co.

STEEL • Penton Building • Cleveland 13, Ohio



From 50% rejects to 1%!

For this tough flaring job *two* brands of Stainless Tubing were tried with 50% rejects. Then they switched to Carpenter *and rejects dropped to less than 1%.*



From 20% rejects to none!

Rejects because of breakage amounted to 20% of each run. Changing to Carpenter Stainless Tubing, *rejects were completely eliminated.*

8c to 10c saved per unit!

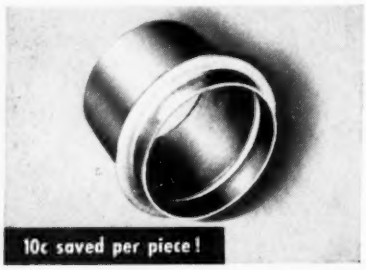
After making comparative tests, the maker of these bottle-filling units specified Carpenter Stainless Tubing *and saved 8c to 10c per unit.*

Easier fabrication and a better product!

After testing tube from several sources, the manufacturer of these condensers found that Carpenter's quality control at the mill gave him easier bending and a better finished job.

15% to 20% saving!

These thermostat sleeves and bulbs require precision fabrication. After changing to Carpenter Stainless Tubing they gained *a 15% to 20% saving in the cost of producing each unit.*



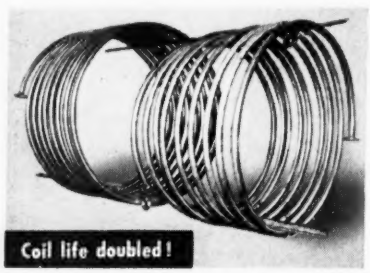
10c saved per piece!

The fabricator of this refinery equipment needed a ductile Stainless Tubing that would "take" the severe fabrication. *Since changing to Carpenter, he figures a saving of about 10c apiece.*

That's why it pays to specify *Carpenter* Stainless Tubing!

40% rejects before—now, 1%!

Before changing to Carpenter, fabricating rejects ran 40%. Now the collapsible handle of this uranium detector is produced—at a reject rate of only 1%.



Coil life doubled!

In a brick-lined hydrolysis tank, lead coils had been used for years. *Then they found that coil life could be doubled with Carpenter Stainless No. 20.*

These are only a few reports from hundreds in our files. They all add up to one important point: *All stainless tubing is not the same.*

Whenever the job calls for something "extra", users of stainless pipe and tubing in a wide variety of industries have come to know that they can depend on Carpenter quality and Carpenter technical assistance to meet the challenge.

It's a good idea to take your problems to Stainless Tubing and Pipe Headquarters. We'll take a personal interest in seeing that they are solved to your satisfaction. Distributors are located in principal cities from coast to coast. The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y. "CARSTEELCO"

more than corrosion resistance

Carpenter

STAINLESS TUBING & PIPE

Analysis · Tolerance · Finish

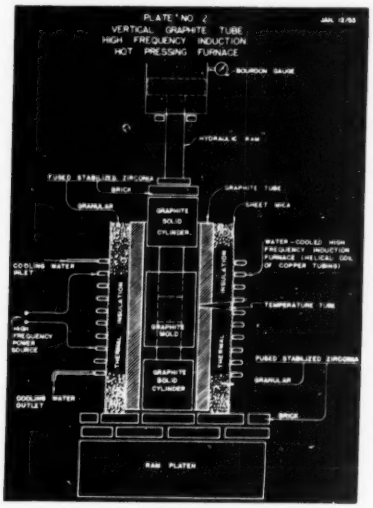
- guaranteed on every shipment

pressure work, can be designed to match the performance of pneumatic rams.

Measuring Temperature—Disappearing filament optical pyrometers are almost mandatory for precise measurement and control. Of course, in the stated range, conventional thermocouples are out of the question. Use of total radiation pyrometers vary with the application, but a suitable setup, intelligently used, may be expected to equal performance of an optical pyrometer.

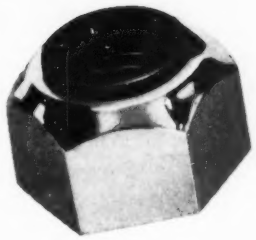
Mold Materials — If mold conducts electricity, it may be heated directly by resistance or induction methods. Non-conducting molds must be heated by indirect methods.

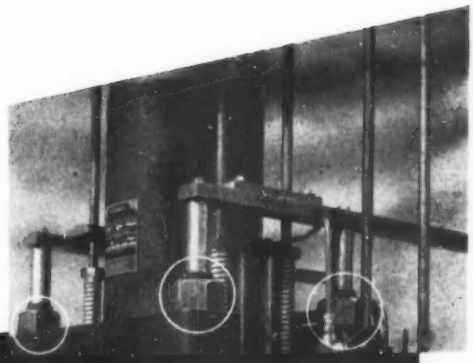
In the range under discussion, graphite, an excellent electrical



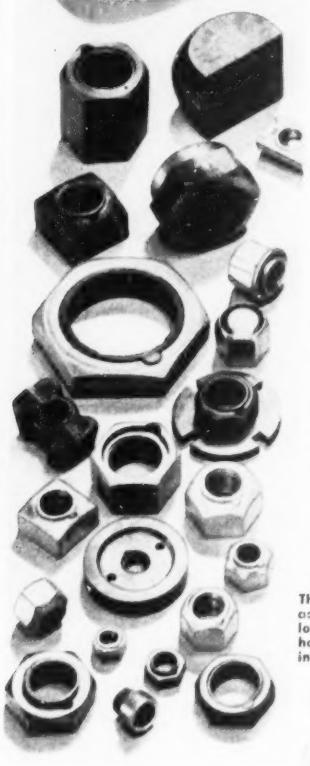
conductor, is the logical mold material. There are a number of graphites on the market, but few are suitable for hot pressing, which requires a dense graphite with highest possible strength in tension. Good machining characteristics are another consideration.

Horizontal Furnace—Horizontal graphite tube furnace invented by R. R. Ridgway, U. S. patent 2,125,588, is probably the most practical hot-pressing unit. It consists of a horizontal graphite tube about 5¼ inches ID x 6½ inches OD x 64 inches long. It is heated by passing electrical current through it. Tube is thermally insulated on the outside by a layer of carbon black.





HOLDING THE PRESSURE LINE WITH *Security*



THE illustration above shows three of the four large Security Locknuts used on the tie rods of one of the many models of the F. J. Stokes Machine Company's fully automatic Plastic Molding Presses. These Security Nuts must maintain their accurate adjustment against the extreme pressures developed by the movable platen.

The interesting thing about Security Locknuts lies in the locking feature. With Security the load is carried by the body of the nut itself not by the *Locking Insert.*

Security Locknuts are vibration proof. They are installed like an ordinary nut. Nothing to adjust—no extra parts—no holes to weaken rods or bolts—nothing to shear—and a Security Nut does not require bolt tension to hold it. It stays "put" where you wrench it at any point on the bolt.

More important than anything else they can be removed and replaced, not once—not fifteen or twenty times—but *any number of times!* Authoritative tests have proved Security Locknut holding power.

Challenge us to solve your toughest fastener problem and ask to see these tests. **Send the coupon.**

THE SECURITY STUDLOC

The Security Studloc can be adapted to provide a positive lock in counterbores and housings or it can be keyed into work to serve as a simple lock nut. An elliptical, heat treated, spring retainer of highest quality spring steel forced into "round" on installation grips the bolt with a force that defies vibration.

THE SECURITY CAPLOC

Here is a cap nut that locks with the grip of the Security Locknut. It provides locking power at a cost no more than an ordinary acorn nut. Here is the answer to those locations where you want to be sure that protection for bolt ends stays there.

SPECIALS:

Here are just a few of the many special locking fasteners that Security has made in a wide variety of shapes, sizes and metals.

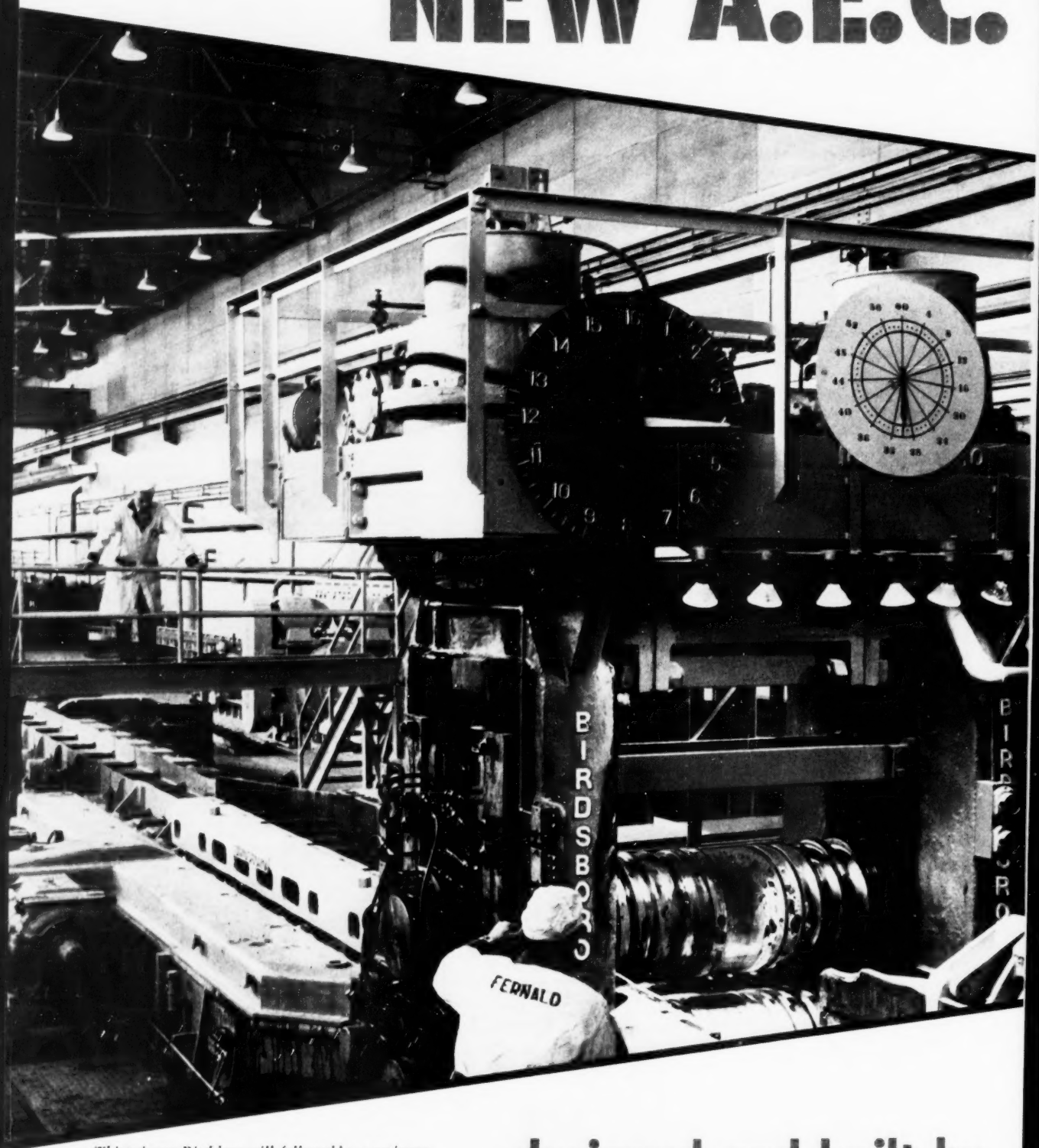
Security
The Nut You Can't Shake Loose

SECURITY LOCKNUT CORPORATION
1504 North Ave., Melrose Park, Ill.

Please send me without obligation:
☐ One of your Thread Tolerance Charts.
☐ We have a fastener problem and would like to know more about Security Locknuts.

Company Name
Address
Town Zone State
Signed

NEW A.E.C.



This primary Birdsboro mill, followed by a continuous Birdsboro finishing mill, is used to roll uranium into bars for further fabrication into slugs used in nuclear reactors.

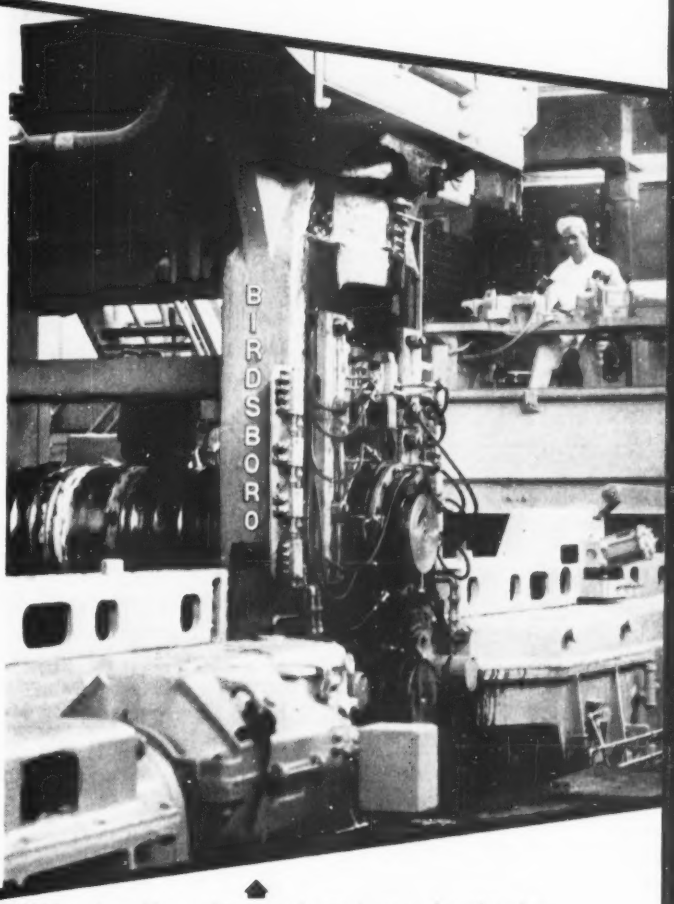
designed and built by

URANIUM MILL

goes into operation at Fernald, Ohio

Birdsboro builds first and only mill expressly designed for production rolling of uranium. New unit becomes an important link in U. S. atomic weapon output.

A. E. C.'s new rolling mill, completely designed and built by BIRDSBORO, now becomes a vital part of the Commission's new uranium production center at Fernald. This center produces uranium for use in A. E. C. fissionable materials plants elsewhere. BIRDSBORO is proud of the prominent role it played in making the new mill possible. It was an exacting job and there was a host of engineering problems to be solved before the mill was completed. Month after month was spent in research and experimentation on the tricky job of rolling uranium ingots into bars. BIRDSBORO started from "scratch", designed and built the mill completely . . . and today it is in steady, high volume production.



Birdsboro brought over 58 years of experience and engineering skill to bear on the new A. E. C. mill . . . the same experience and know-how the Company offers you in your search for better, lower-cost mill rolling operations.

UNITED STATES
ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

April 3, 1953

Mr. J. M. McCauley, President
Birdsboro Steel Foundry & Machine Company
Birdsboro, Pennsylvania

Dear Mr. McCauley:

It is with pleasure that I commend Birdsboro Steel Foundry & Machine Company, and in particular the Engineering Department of its Rolling Mill Division, on an outstanding performance in designing and manufacturing a special mill to roll uranium for the United States Atomic Energy Commission. Not only was this an extraordinary achievement in terms of speed, but the costs of the mill have been held well in line with the original estimates which were projected from quite sketchy information. This is indeed a credit to your Company, and bespeaks the high ability of your staff. . .

Again I wish to thank and commend you, and through you the Birdsboro staff, on an excellent job.

Very truly yours,

H. B. Fry
Manager

M:HBFrab

". . . an extraordinary achievement in terms of speed . . . a credit to your Company, and to the high ability of your staff."

BIRDSBORO

MM 2N-61

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA.

STEEL MILL MACHINERY

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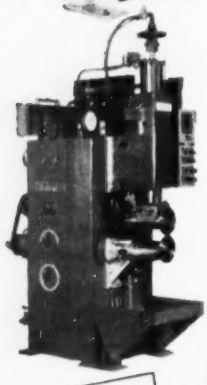
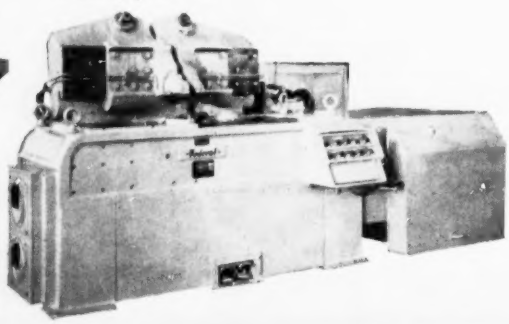
Let us work with you on your resistance welding applications, so that you can benefit from our engineering and production background. Remember, our experience pays you dividends in lower equipment costs and faster solution of your welding problem.





Federal WELDERS

Warco PRESSES

THE FEDERAL MACHINE & WELDER COMPANY

WARREN, OHIO

Furnace Fusing Tester

This miniature furnace is part of the laboratory pilot plant in the enlarged research center operated by Pfaudler Co., Rochester, N. Y. Here glass is fused to a steel crucible for experimental purposes. The glassed-steel and alloy equipment maker has made such tests standard for all new glasses and regular production work

---

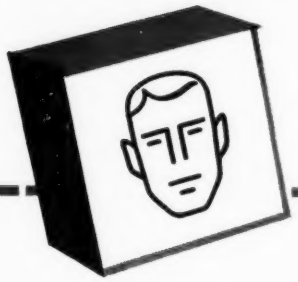
about 8 inches thick, enclosed with an aluminum shell.

Loaded 5⅛ inch OD mold to be hot pressed is placed in the center of the tube. A solid cylinder of graphite, 5⅛ inches OD x 30-inches long, is placed in each end of the tube to abut the plungers on the loaded hot-pressing mold. Pressure is applied by means of a pneumatic ram pushed against the ends of the 5¼-inch graphite cylinders that project from the furnace tube.

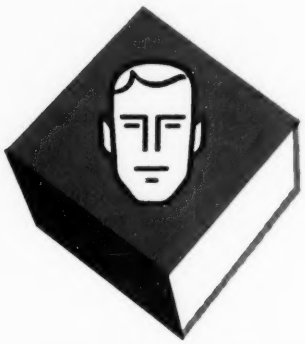
Vertical Furnaces—Most vertical graphite tube furnaces are heated by high-frequency induction. Here's why: 1. It is a simple matter to install such a furnace in the clear opening of an hydraulic press. 2. It is relatively difficult to apply thermal insulation to a high frequency induction coil setup in a horizontal position.

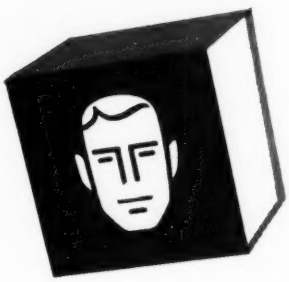
Typical unit for repetitive molding in a vertical tube furnace heated by high-frequency induction has the induction coil carefully centered in an hydraulic press. Design and size of coil is such that efficient coupling, plus adequate thermal insulation, can be achieved.

A central tube, usually of graph-



Are you getting the most out of YOUR ALLOY STEELS?





REPUBLIC 3-DIMENSION METALLURGICAL SERVICE

can help you answer this Question

You may be getting all the qualities you expect from the alloy steels you use. But you may not be taking advantage of some important properties which could make your products even better. Or cheaper to produce.

The best way to find out is to call in Republic's Three-Dimension Metallurgical Service. Here's how it works. First, Republic Field Metallurgist looks over your products and your plant. His report goes to the Republic Mill and Lab Metallurgists. All three then pool their knowledge of alloy steels, heat-treatment, and fabrication.

The results: recommendations that often mean better products, higher production and lower costs. And there are scores of Republic customers who have had this pleasant experience.

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LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

INDUSTRIAL RUBBER PRODUCTS

ite and having a bore slightly larger than the OD of the hot pressing mold, is centered within the furnace coil. The OD of the tube is such that 1 to 2 inches of thermal insulation may be applied between the OD of the tube and the ID of the furnace coil.

Layer of Mica—To prevent the granular insulation from leaking out, a layer of mica, asbestos or cloth is applied to the inner surface of the furnace coil, before the granular insulation is installed. It is also customary to install thermal insulation between the furnace coil and that part of the press supporting it to avoid overheating at this point.

Loaded mold is placed in the center of the graphite tube. It is supported in that position on a graphite solid cylinder of suitable length and having a diameter slightly smaller than that of the furnace tube. Another solid cylinder of graphite with the same OD is placed in the tube on top of the mold.

This cylinder transmits pressure from the ram to mold plungers. Thermal insulation also is placed between the ends of the solid graphite cylinders and the hydraulic press ram and platen.

As in the case of the horizontal tube resistance furnaces, power is applied at a high rate initially, then cut back to prevent overrunning the desired molding temperature.

Tough Metal-Plywood Laminate

Structural material for motor truck bodies, combining the strength and durability of metal and cross-grained woods, now offers economies in both original and operational costs of trucks.

This material—Armorply, product of U. S. Plywood Corp., offers greater rigidity, less vibration and reduces weight in the finished truck body.

Armorply is a laminate, with a metal facing bonded to one or both sides of a plywood core. While almost any metal of almost any thickness, can successfully be used for this facing, aluminum, zinc-coated steel or stainless steel are generally employed. The usual thickness of the metal is approximately 0.025 inches.

NOW - - - an improved water-mix base oil especially formulated for both cutting and grinding application

DASCO
SUPER SOLUBLE BASE

ONE phase of Stuart's continuous research program on metal-working oils and compounds has been directed toward the formulation of a better water-mix cutting and grinding fluid. A heavy duty type water-mixture that would improve machine efficiency on both classes of work, and which could be used at leaner mixtures than normally recommended for soluble oils.

FOR WATER-MIX CUTTING APPLICATIONS. A heavy duty water-mix cutting fluid base, capable of filling the gap between conventional soluble oils and straight cutting oils, must contain more than ordinary petroleum oil if superior performance is to be realized. The manufacture of Dasco Super Soluble Base incorporates a heavy duty base oil — widely known for its performance record on the toughest metalworking jobs.

The advantages gained from this unique feature include superior performance at leaner mixtures than other heavy duty water-mixes. Mixtures normally start at 40 to 1 for turning, drilling, milling, sawing, boring, reaming. Only on some surface broaching, and round hole broaching operations has it been necessary to use mixtures as rich as 15 to 1.

FOR WATER-MIX GRINDING APPLICATIONS. Cylindrical, surface, and centerless grinding operations call for a water-mixture with a higher detergency factor than that found in ordinary soluble oils. Better rust inhibiting and stability characteristics are required because of the leaner mixtures usually used for grinding. Dasco Super Soluble Base has been used for exceptionally long periods of time, at leaner mixtures than 100 to 1, the recommended starting mixture, with no problems due to rusting, separation or rancidity.

TWO WATER-MIXES BUILT INTO ONE. The combination of extra cutting value, high grinding value, excellent stability and great resistance to rancidity makes Dasco Super Soluble Base an ideal water-mix for both cutting and grinding — one that has been especially formulated to give top performance on both classes of work — at leaner mixtures than ordinarily recommended for other heavy duty products — and priced lower than normal for a product of such high quality. Send coupon for complete data.

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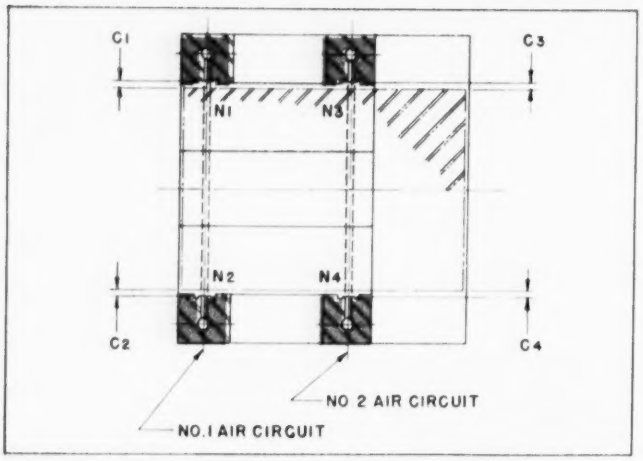
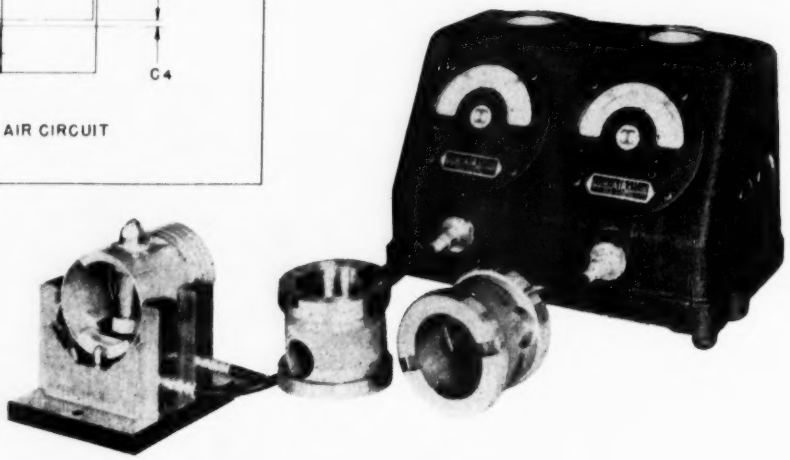


Fig. 1—Computing air indicator works alongside a standard indicator to tell story of piston-skirt taper. Variables are entered on two sides of instrument—then canceled out. Schematic drawing at left shows how circuits allow for varying diameter. The dial reads taper



Air Gaging:

A CHALLENGE AND AN ANSWER

Need for closer measuring at a faster pace by unskilled personnel—that's what the gage engineer lives with. One development lets the variables cancel themselves

By F. MEYER JR.
Taft-Peirce Mfg. Co.
Woonsocket, R. I.

BIG PROBLEM for the gage engineer today is to provide measuring equipment that can be used by unskilled help, and give results that, in the past, were achieved only by skilled gage makers with many years of practical experience.

This means that required precision must be built into gaging equipment and it must be practically foolproof and free from human error, even when used by operators of limited skill. This problem and the search for its answer have led to the growth of the air gage as a production measuring tool.

Limited Start — During World War II, industry started to use the air gage for production inspection. Originally, the gage was considered only for measuring internal diameters whenever a high degree of accuracy was required.

As the advantages of air gaging became apparent, its application became more diversified. It is now used for checking numerous dimensional relationships, such as concentricity or alignment between two diameters, squareness of bore to face, center distance between bores, angle of taper, etc. Often, several of these dimensional characteristics are checked simultaneously.

Double Trouble—When the air gage is used for one of these measuring problems, the setup is complicated since there is always more than one variable involved. Readings are not only affected by variation of the above factors, but also by variations in bore diameter. Total effect of both variables must be considered in arriving at the final result.

Thus it is necessary to use at least two air circuits and a like number of standard air indicators to arrive at the desired result. The operator frequently has to take readings from two air indicators, then add or subtract the respective readings before the final answer can be obtained.

This computation is required when checking tapered parts, center distances between holes, and clearances between mating parts. When checking concentricity between diameters or squareness of bore to face, it is usually not necessary to obtain results from separate indicators and then compute an answer, but due to the permissible variation in diameter involved, position of the tolerance range on the scale will change if diameter varies from its mean value.

Applied at Both Ends—Recently a new type differential air indicator was developed which overcomes this objection. With this indicator, two air circuits are applied to opposing chambers of the differential device. The gaging nozzles are placed in the gage member so the effect from any variation of diameter will be applied on both sides of the gaging equation, thus nullifying its effect on the reading.

This way it's possible to get readings for these dimensional characteristics on a single dial with a single pointer. Since the indicating device receives the results of two gaging circuits and makes an auto-

matic computation of the effect, it's called a computing indicator.

Skirt Test—One application example of the computing indicator is the gaging of a piston skirt. As shown in Fig. 1, the skirt diameter at the bottom end of the piston is checked by a standard air circuit indicator, while the taper of the skirt section is shown by a computing indicator. There are no unusual construction features required in the gaging member. Design is the same as when it is used with standard air indicators.

As shown in the schematic, circuit #1 is connected to a standard indicator which will show the diameter at the large end of the piston. In addition, a bypass from this circuit is connected to one differential chamber of the computing indicator. Circuit #2 is connected to the other chamber of the computing indicator.

Double Entry—If the diameter being checked by nozzles N_1 and N_2 should vary from the mean value, then the sum of the clearance (C_1+C_2) will also vary from the mean amount and the diameter will be shown on the standard air indicator. Effect of clearances C_3 and C_4, as checked by nozzles N_3 and N_4, will be imposed on the other chamber of the computing indicator. If the angle of taper is at the mean value, but the diameters at (N_1, N_2) and (N_3, N_4) are greater or less than mean, then (C_1+C_2) and (C_3+C_4) will be increased or decreased by like amounts.

Since (C_1+C_2) and (C_3+C_4) are being applied in opposing circuits to the differential chambers of the computing indicator, if their sums are increased or decreased by equal amounts, the variations on each side of the gaging equation will cancel each other and have no effect on the resultant reading. The angle of taper then will be indicated as zero (mean) on the computing dial.

Diameter variation within the gaging range will not affect the indication of taper as shown by the computing gage. When the angle varies from the mean value and the summation of (C_1+C_2) does not equal (C_3+C_4), the amount of variation from zero will be indicated by the computing unit.

Six Circuits—Another gage installation, shown in Fig. 2, is used for checking bend, twist and center distance of the bores in an automotive connecting rod. A total of six air circuits is employed and their gaging results are shown on the dials of three computing indicators. Exact values of bend, twist and center distance are read directly regardless of variations in bore size.

Even though there is a permissible 0.004-inch variation in center distance, the guide surface of the air plugs can be made small enough and the nozzles recessed sufficiently so the gaging fixture is made with fixed plugs, eliminating any moving parts.

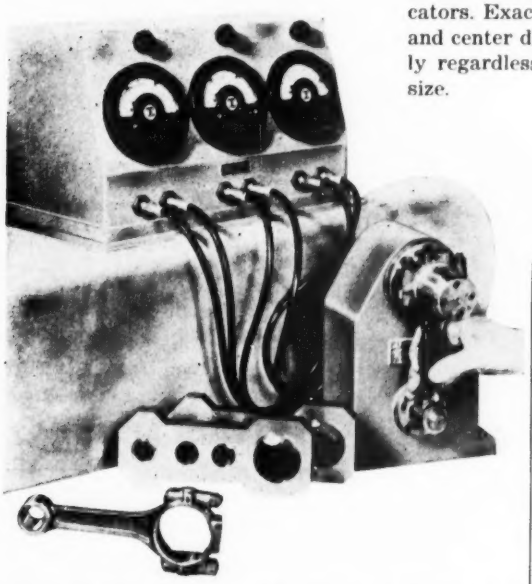
As in the case of skirt taper, variation in bore diameters will not affect the gaging result shown on the computing dial. Bend and twist conditions are checked in a similar manner, through proper positioning of nozzles in the air plugs of the gaging fixture. Schematic drawing for this installation is also shown.

Wide Limit Gaging — Another recent development in air gaging is the special contact device designed for checking wide tolerance ranges.

Contact-type air gage members have been used for several years for checking parts with surface finishes beyond 50 microinches, rms, or wherever the section of the part to be gaged is of a limited area which can't be checked by having the air impinging directly against the part surface.

Gap Reading—These members are usually designed with a contact button mounted on a read-type spring and positioned directly over an air nozzle. The contact button or buttons engage the part surface and indications of size will be obtained according to the resulting clearance between the reference or back face of the contact button and the surface of the air nozzle.

Original designs of the air con-



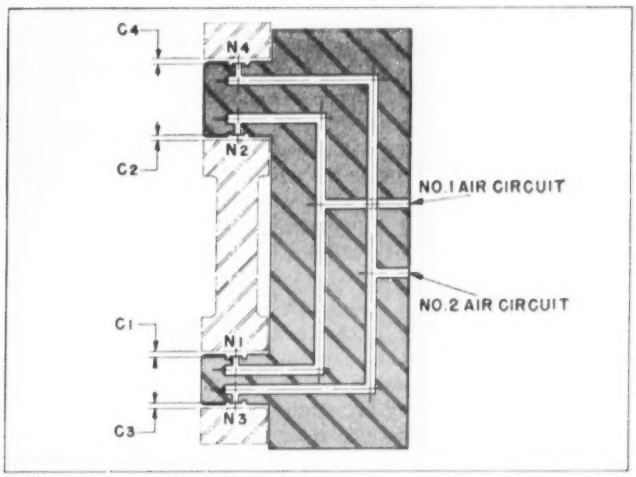
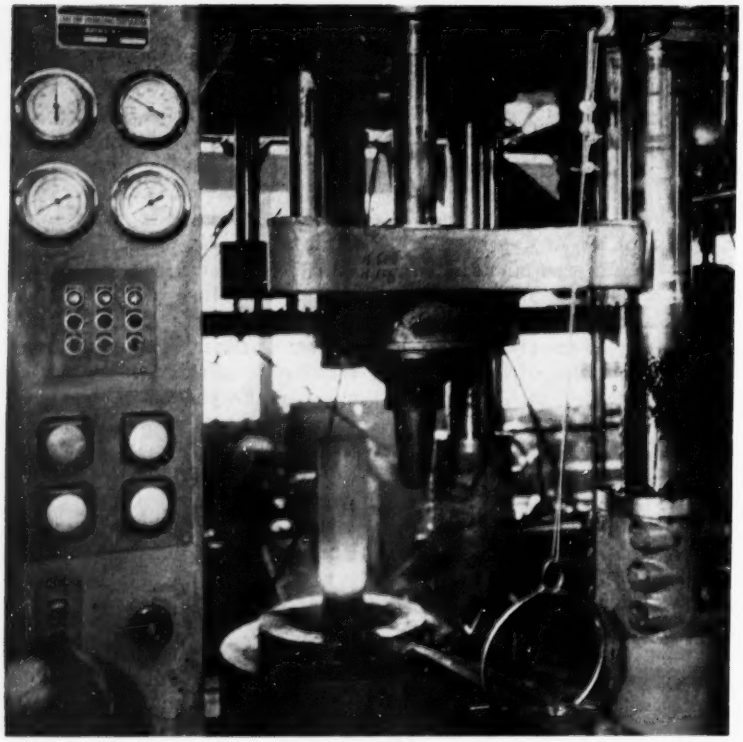


Fig. 2—Connecting-rod hole center distance, bend and twist are shown on separate indicator dials. Schematic shows air circuitry. Variations in sizes of the holes are canceled out by being applied at both ends of computer equation. Result: No calculation by operator



Production Testing To The Nth Degree

To fully test its 155-mm press equipment for a new shell forging plant on the West Coast, Lake Erie Engineering Corp., Buffalo, N.Y., set up in its own assembly department, complete facilities for the actual production of such shells. Here is a closeup of the 600-ton press, showing pierced billet being ejected. Tool slide has moved forward to position slugging tool for next billet. The June 29 issue of STEEL incorrectly identified this photo

tact gages were limited to a gaging of about 0.008-inch, the same as that of the direct jet type. By design variations in the angle of approach between the reference face of the contact and the surface of the gaging nozzle, it's possible to check tolerance ranges up to 0.125-inch.

Wide Range—Single reed mounting of the contact can be followed for tolerances below 0.015-inch. Beyond this figure, the contact should be mounted on parallel reed springs, or in some instances on an antifriction ball slide. Type of contact mounting will be dependent on the individual application.

Through these special contact members for checking wide tolerances, the scope of air gaging has been greatly increased. In most instances, it is now possible to design suitable air gaging equipment to check any specific tolerance range from 0.0001 to 0.125-inch. Although extreme accuracy is not usually required when the tolerance range is large, it is still possible to reap the other advantages with no moving parts required to transmit results to the indicator, exact indications of size, and gaging in restricted areas, and checking of many dimensions simultaneously. As many as 39 dimensions can be checked at one time, as in turbine blade contour gaging.

Furnaces For Research Installed

New melting units—including a 2000-pound electric arc furnace, a 500-pound Ajax induction unit and a cupola for melting 700 pounds of iron per hour—are now ready for operation at the new metal processing research laboratory of the school of mineral industries, Pennsylvania State College, State College, Pa.

The charge of the furnace may vary widely in size, and it is reported that any type of melting and finishing operations can be used with the new facilities. Open-hearth practice may be simulated since the furnace can produce melts using a single oxidizing slag. Melts also may be produced under the two-slag process, or special refining operations may be used which utilize two or three refining slags.

See-through Welding Flux

A unique new type of aluminum welding flux—one that allows the operator to see exactly what he is doing while welding—was announced by Solar Aircraft Co., San Diego, Calif.

Solar has previously manufactured welding fluxes for stainless and high alloy steels, but the new Type 202 marks the company's entry in the aluminum welding flux field.

Puddle Visible — Real secret of Type 202 lies in the effectiveness of its fluxing action — the weld puddle is not hidden behind an opaque blanket of refractory slags. Following a series of laboratory and field tests, Solar cites the following characteristics of the aluminimum welding flux:

1. It starts to reduce oxides immediately upon application and continues to do so throughout heating cycle.

2. It is easily removed after welding, and will not produce corrosive pitting on the parent metal.

3. It becomes liquid at the point in the heating cycle when the metal is ready to weld, and therefore serves as a good temperature indicator.

Easily Applied—Flux is an excellent wetting agent, and is easily applied. With it, the hotter flame of oxyacetylene can be used in aluminum welding without undue fear of overheating. Useful as a back-up material on butt or T joints to control penetration, it can also be used to eliminate the oxide notch on the back of the work.

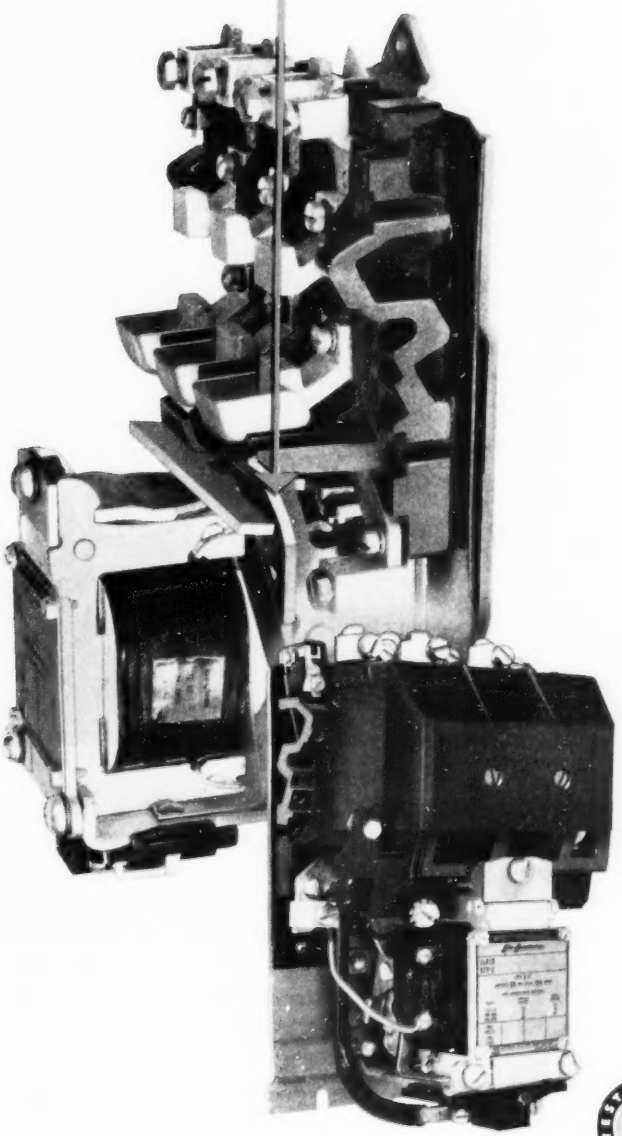
The flux allows the operator to see readily the molten puddle, and no puddling stick is needed to remove oxide slag. Material is sufficiently active and fluid to carry off the opaque slag blanket automatically.

Knife-edge Action . . .

accents dependability

eliminates trouble

in A-C "NR Contactors"



Long, trouble-free, dependable service . . . with Westinghouse NR Contactors!

Here you have a contact closing arrangement designed with fewer moving parts! The entire contact assembly pivots on a knife-edge of specially hardened steel. As a result . . . no sliding surfaces to bind or wear . . . no misalignment troubles. Friction is at a minimum! Jamming and sticking are eliminated! Nothing need be lubricated!

NR Contactors perform accurately. Positive-action, kick-out springs give sure contact openings—independent of gravity. You've got full protection against false operation from vibration or accidental impact.

The contact is double break, spring loaded, tipped with silver . . . which means constant high conductivity . . . no need for filing, dressing or cleaning. Westinghouse-developed "De-ion®" Arc Chamber snuffs out the arc in half cycle or less, thereby minimizing contact damage.

Yes, you get superior performance for any contactor application with Westinghouse NR Contactors.

Learn many other features and the performance story of these NR Contactors by asking your Westinghouse representative or writing directly to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21678

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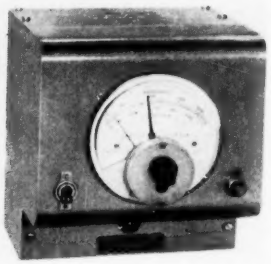
NEW PRODUCTS and equipment

Reply card on page 117 will bring you more information on any new products and equipment in this issue

Induction Heat Controller

. . . maintains 2 per cent accuracy

The Cyber-Tac controller is a contact type instrument used in conjunction with an electronic circuit. It is a combination cut-off



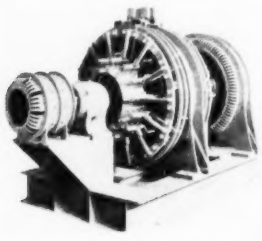
and automatic hold-type controller and it is equipped with a thermocouple breaker protection. Tests have shown that the Cyber-Tac model number 505 is capable of maintaining control temperature to an accuracy of 2 per cent of full scale range for over 1,000,000 continuous contact cycles. Cybertronic Corp. of America, Dept. ST, 136 8th St., Upland, Chester, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 1

Motor-Generators Redesigned

. . . all-welded construction

New line of low voltage motor-generator equipment features im-



proved commutation, all-welded steel construction, increased accessibility and more open ventilation, which results in greater overload capacity and higher over-all efficiency. Extra windings on the rotor poles of the synchronous driving motors produce high-starting torque, permitting the use of a cross-the-line starting device.

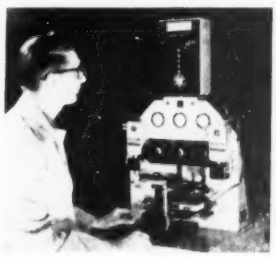
High pull-out torque permits efficient, smooth operation even when the generator is overloaded. Chandeysson Electric Co., Dept. ST, 4068 Bingham Ave., St. Louis 16, Mo.

FOR MORE DATA—CIRCLE REPLY CARD NO. 2

Multi-Check Gaging

. . . spots five diameters at once

Multiple gage or Multichek inspects simultaneously five bearing



diameters on a drive shaft, and indicates by means of lights whether or not the dimensions are within tolerance, oversize or undersize. Three gage heads check the dimensions to tenths and the other two for thousandths of an inch. At 100 per cent efficiency, the instrument inspects 600 to 800 shafts per hour.

If all dimensions are within tolerance, the master light at the base of the light panel remains white and the five signal lights black out. If one or more dimensions are out of tolerance, the master light turns red and individual red or green signal lights indicate respectively undersize or oversize. Where dimensions are correct lights remain blacked out. Sheffield Corp., Dept. ST, Dayton 1, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 3

Magnetic Indicator Holder

. . . mounts on curves or flats

This device constructed with permanent Alnico magnets, exerting

50 pound pull, will mount on all ferrous surfaces, curved or flat. Onto the magnetic base is fastened a laterally-adjusting mechanism, controlled by thumb screw. With an adjustment travel of $\frac{1}{2}$ inch the operator can zero in the indicator without touching it or the work.

Holder will accommodate indicators up to 3 inches in diameter, and shoulder screw attachment arrangement permits indicator to be tilted through 270-degree arc without loosening or tightening any screws or nuts. Cullen Mfg. Co., Dept. ST, Racine, Wis.

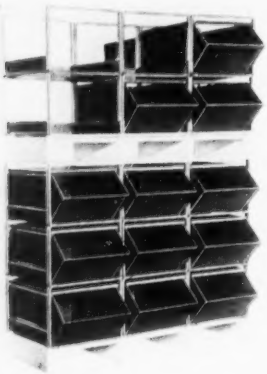
FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Palletized Storage Flexibility

. . . permits fork truck handling

Made to fit patented Stackracks into which Stackbins, boxes, tote pans slide like drawers, pallets are designed with adequate clearance for easy handling with fork trucks. Bottom of each pallet interlocks with top of a Stackrack assembly so that palletized units can be safe-

ly stacked one above the other. The new pallet further improves the efficiency of the Stackbin system of



parts storage and handling by eliminating one step in manual handling. Construction is of heavy gauge channel and formed steel, strongly welded and finished in baked-on enamel. Stackbin Corp., Dept. ST, 1123 Main St., Pawtucket, R. I.

FOR MORE DATA—CIRCLE REPLY CARD NO. 5

Nonmagnetic Cold Chamber

. . . stops stray magnetic fields

This chamber is used in determining effects of temperature on

electrical fields in the development testing of pure metals. Since stray magnetic fields hamper such testing, the unit contains no steel whatever.

Construction is entirely of brass, copper, aluminum, rubber, bakelite, glass, wood and fiber glass. All motors and electrical components are located 6 feet away to eliminate effects of their electrical fields. The unit produces temperatures from −112° F to +68° F, with close temperature control. Special thermally-governed chamber assures holding of temperatures to ±0.1° F. William Schaller Co., Dept. ST, 270 Farmington Ave., Hartford 5, Conn.

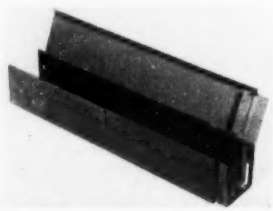
FOR MORE DATA—CIRCLE REPLY CARD NO. 6

Lay-In Wiring Trough

. . . no threading or pulling

Wireway installation time is reduced as much as 20 per cent since threading or pulling conductors are eliminated with this unobstructed lay-in duct. All duct lengths and connectors are hinged to provide easy installation, and only two screws are required to join the two sections.

Complete line of fittings with removable covers is available with a universal two-piece hanger for mounting the duct. Standardized sections are 2½ x 2½, 4 x 4, and 6 x 6 inches in size. Adapter fittings for joining other forms of



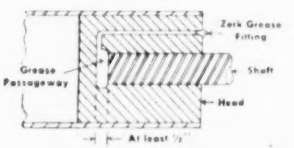
duct, panelboards, switchboards or electrical devices are available. Square D Co., Dept. ST, 6060 Rivard St., Detroit 11, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 7

Replaceable-Shaft Rolls

. . . pressure ejects worn shaft

Renu-Shaft rolls make it no longer necessary to discard a good brass roll because of the difficulty of replacing worn or broken shafts. At the base of the shaft, which is pressure fitted into the roll head,



is a well which is connected to the face of the head by a right-angle channel sealed with a Zerk grease-fitting. With the fitting open, and the shaft hole filled with grease, the shaft is driven in to within ½ inch of full depth. The fitting is then closed.

If it becomes necessary to replace the shaft, a hand grease gun or similar equipment of 10,000 psi capacity is applied to the fitting. Pressure of several tons on back end of the shaft is created, causing steady removal from roll body. Replacing shaft takes a few minutes instead of several hours. Rodney Hunt Machine Co., Dept. ST, Orange, Mass.

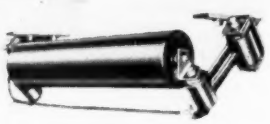
FOR MORE DATA—CIRCLE REPLY CARD NO. 8

Self-Aligning Return Idler

. . . no side guides needed

Idler consists of a dead-shaft roller-bearing return roll, mounted at each end to a toggle-like arrangement of swivel arms suspended from the conveyor framework at an angle of approximately 45 degrees in the direction of belt travel. Movement of belt to one side results in increased weight on that side which, due to the idler construction, causes that end of the roll to move forward and downward. At the same time, the opposite end of the roll is moved backward and upward and this changing of the normal position of the roll with the belt, guides belt back to the central position.

Since most belt damage from roving occurs on the return run where the belt is closely confined between frame and supports, the



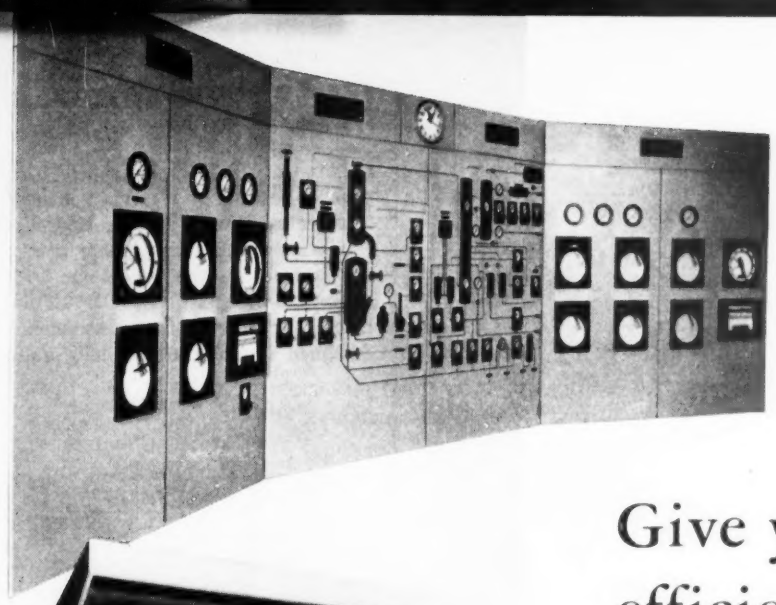
positive aligning action without use of side guide idlers, should greatly reduce this danger. Idler will operate in one direction only, but works equally effectively on horizontal, inclined, or declined conveyors. Effect of build-up of material on the roll is negligible. Chain Belt Co., Dept. ST, Milwaukee 1, Wis.

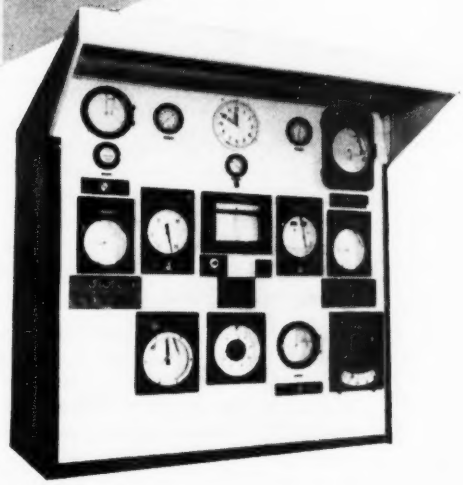
FOR MORE DATA—CIRCLE REPLY CARD NO. 9

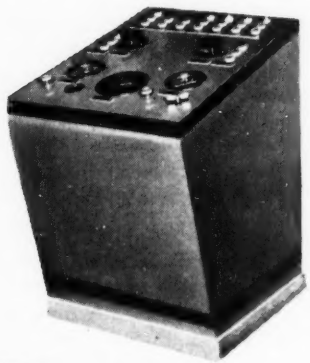
Accurate Portable Meters

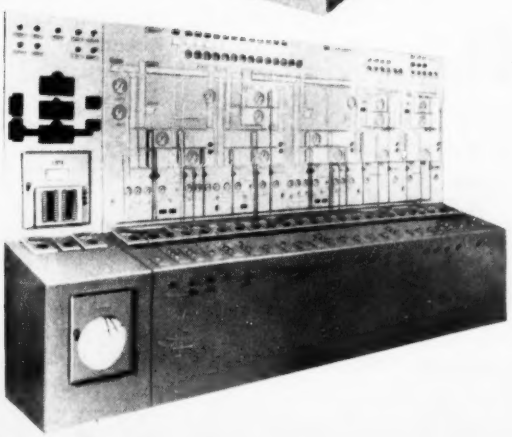
. . . light, rugged construction

Two series of improved, type DP-11 and DP-12, meters are available to indicate volts, watts, amps, and









Give your process efficient centralized control *with*

Honeywell Panels

THE CONTROL centers of your plant can contribute important improvements in operating efficiency, ease of supervision, labor savings. To achieve the full potential benefits of this modern control concept, it will pay you to specify Honeywell custom-engineered panels. The choice of leading manufacturing and consulting firms, Honeywell panels are made in a wide variety of types . . . a few of which are shown here.

Every Honeywell panel is custom-designed for its individual application, by specialists who are thoroughly experienced in all phases of industrial process control. However simple or complex your process requirements may be, Honeywell engineers can work out an efficient panel design. They combine attractive appearance with functional arrangement of all components—to produce a layout that affords maximum convenience, minimum fatigue, simple manipulation and easier training for operators.

Your Honeywell panel reaches your plant in whatever form best suits your needs. It can be completely preassembled and shipped with all instruments, controls and accessories fully wired, piped and tested. Or, if you prefer, panels and instruments can be shipped separately and then assembled at the site by qualified Honeywell installers, or by your own mechanics . . . if you like, under our supervision.

Your nearby Honeywell sales engineer will welcome the opportunity to discuss centralized instrumentation for your plant . . . and he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4462 Wayne Ave., Philadelphia 44, Pa.

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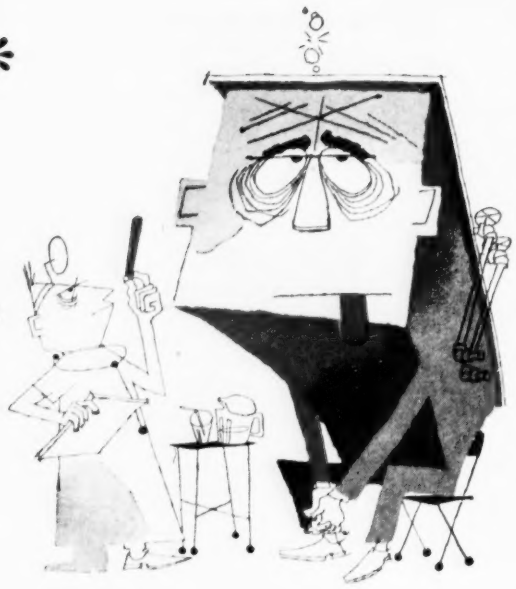
increasing

your

temperature

problem?



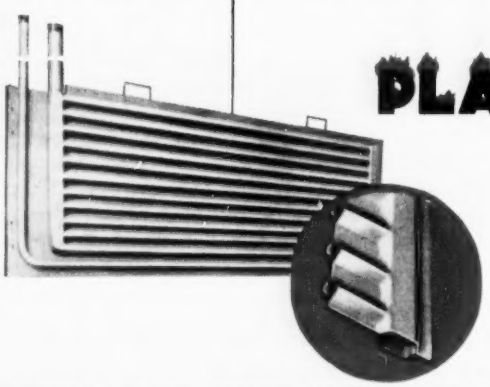
Here is a new treatment for solving your heat transfer problems that is as revolutionary as a new wonder drug. It stops coil-itis* cold . . . It eliminates the many troubles that have plagued industrial heating and cooling practices due to the use of old-fashioned, outmoded pipe coils. This revolutionary new unit, called a Platecoil, heats or cools 50% faster and takes 50% less space in the tank. It simplifies maintenance and saves hours of downtime.

Write for bulletin P72 today!

PLATECOILS SAVE 50% IN HEAT TRANSFER COSTS

PLATECOILS COOL QUENCH OIL TANK FOR ⅓ THE COST

At the K-D Manufacturing Company, Platecoils are proving more efficient, yet cost only 1/3 as much to install. Ask about other case histories.



PLATECOIL

REPLACES PIPE COILS

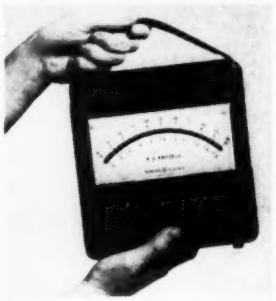
*

Coil-itis — Diagnosed as tank heating and cooling problems. Platecoils — the prescription for solving pipe coil problems.

PLATECOIL DIVISION, TRANTER MANUFACTURING, inc., LANSING 4, MICHIGAN

NEW PRODUCTS and equipment

milliamps. DP-11 was designed for general testing by electrical maintenance men who need a rugged, easily-read indicating instrument with an accuracy of ½ of one per cent of full scale. The DP-12 is a high precision testing instrument designed for laboratory, field, and



production use. Accurate to ¼ of one per cent of full scale, this instrument is particularly suited to the maintenance of portable or switchboard instruments, control panels and numerous production devices.

Both are encased in molded Textolite having heavy ribbing and rounded corners which reduces breakage. Longer, more transparent, unbreakable molded windows permit increased readability in both of the new lines. Each instrument measures 7¾ by 7⅞ by 3¼ inches and weighs 5 pounds. General Electric Co., Dept. ST, Schenectady 5, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Flexible Grinding Wheel

. . . made of abrasive leaves

This tool known as Grind-O-Flex, is a flexible grinding wheel which consists of hundreds of individual abrasive cloth leaves sealed to a hard core. As the wheel rotates it presents a continuous abrasive surface to metal parts, smoothing surfaces and removing

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Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

TEAR OUT CARD, FILL IN and MAIL TODAY!

69. Temperature Recording

Foxboro Co.—Devoted to the understanding, selection and use of temperature recording instruments, 20-page illustrated bulletin 447 shows construction details and typical installations. Characteristics of gas and vapor pressure and liquid expansion systems are explained in three pages of text and reference charts.

70. Magnetic Separator

S. G. Frantz Co.—Made for extraction of ferrous contamination from circulating lubricating and cutting oils, hydraulic oils and coolants, Ferrofilters are described and illustrated in 6-page folder. Recommended applications, available sizes, capacities and dimensional data are all provided.

71. Corrosion Control

D. W. Haering & Co.—The particular use of each glucosate made by company for correction and control of corrosion, scale and algae is presented in folder booklet. Product is sold in ready-to-use drums.

72. Tap Manual

Threadwell Tap & Die Co.—Latest data on tapping as well as on Unified and American screw threads is contained in 56-page pocket-size "Tap Manual." Tabulated dimensions, sizes, tolerances and flute information are featured. Manual will aid proper selection and use of all tap makes.

73. Dehydrators

Selas Corp. of America—"Selas Dehydrators," a 12-page illustrated bulletin (SC-1013) describes equipment for continuous removal of water vapor from air and other gases, to dew points as low as —100° F. Three series are covered, and capacities and physical dimensions are given.

74. Dieing Machines

Emhart Mfg. Co., Henry & Wright Div.—In 60 illustrated pages, catalog No. 53 covers complete line of Henry & Wright dieing machines which range in capacity from 25 to 400 tons. They represent latest models and highest operating speeds for every stamping and punching operation from simple blanking to multiple station progressive dieing. Accessories are also treated.

75. Sheet Metal Tester

Steel City Testing Machines Inc.—A nondestructive tester of sheet metal for drawing qualities and stretcher strain, model B-1 Flex-Tester is described in 4-page illustrated folder. This lightweight portable instrument provides a quick means of testing before drawing or stamping operations.

76. Diamond Lapping Compound

J. K. Smit & Sons, Inc.—Dealing with Mirra-Lap, the company's diamond lapping compound, brochure illustrates and describes applications and features of the various grades available. Use, packaging and price information is also given.

77. Shop Equipment

Standard Pressed Steel Co.—Including steel work, cabinet and multiple unit benches; bench legs; shop desks; tool stands and carriers and many other items, Hallowell steel shop equipment is the subject of 4-page illustrated bulletin 839. Materials, color, dimensions and shipping weight are provided.

78. Shell-Molding Blending

Patterson-Kelley Co. — Explaining how to blend resin-sand mixes for the shell-molding process, 4-page illustrated catalog 404 also has data on a machine which will do the job fast, thoroughly and without dust. Information is given on charge, order of charge, mixing time and discharge characteristics of the blends.

STEEL 7-20-53

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79. Strip Fasteners

Prestole Corp.—Up-to-date engineering data on standard line of improved tandem strip fasteners is offered in bulletin 233-4-5-A. Info will be of particular interest to sheet metal fabricators handling blind assembly applications.

80. Carbide Tooling

Kennametal Inc. — Step-by-step progress in development of carbide tooling for the steel industry is given in booklet "Kennametal Carbide Tooling for the Steel Industry." It illustrates tools, describes operating procedures and gives performance facts about tooling on lathes, heavy duty milling machines, planers and other mill equipment.

81. Cold-Finished Steel Service

Jones & Laughlin Steel Corp.—Carbon restoration, annealing, normalizing and bright annealing are extra services now available to users of cold-finished steel with the installation of a new controlled atmosphere furnace. Eight-page booklet describes the facility and its operation.

82. Cylindrical Grinders

Landis Tool Co.—24-page general catalog CG-53 illustrates complete line of precision cylindrical grinding machines. About 23 photos, sketches and brief specifications are offered to show application and size of each type machine, including universal grinders, plain grinders and single purpose high production types.

83. Motor-Generator Sets

Reliance Electric & Engineering Co.—4-page illustrated bulletin on shunt and compound wound motor-generator sets describes units for constant or adjustable voltage power systems in ratings from ¾ to 1000 kw. Typical installations of six units are pictorially shown.

84. Various Alloys

Alter Co.—In 24 pocket-sized pages, "Master Alloys" booklet presents data on various standard and special alloys for use in the iron and steel and nonferrous foundry industries. Information on pure copper shot, copper-chromium, copper-iron, copper-silicon, copper-manganese, nickel-copper, nickel-chrome, nickel-iron, nickel-chrome-copper and copper-nickel is given, along with many other data.

85. Cutting Torches & Tips

K. G. Equipment Co.—Model M38 general purpose and model B occasional-use cutting torches are illustrated in 2-page data sheet. Both have optional heads and can be used on all fuel gases. Various cutting tips are also shown.

86. Automatic Deburring

Osborn Mfg. Co.—Two case histories exemplifying savings possible with automatic deburring machines are presented together with description of a power brush model in 4-page folder entitled "Automatic Deburring." Surface finishes to within 6 to 10 microinches can be attained.

EDITORIAL ARTICLES
Available in Limited Quantities

87. Die Casting

Record use of zinc and almost 50 per cent increase in use of aluminum are evidence that more manufacturers are applying die casting in their fabrication processes. Dr. A. G. Gray, Technical Editor, elaborates on this growth and points out competitive factors of die casting techniques in STEEL article "Let Die Castings Help Keep Costs in Line."

88. Simplicity in Handling

Handling redesign can evolve out of consolidating operations in a roomier plant. W. R. Wolfe, Assistant Editor, presents some of the steps Electric Storage Battery Co. took to make the opportunity produce profits in STEEL article "Plans Grow from Blueprint Stage."

89. Temperature Control

Minute changes in radiation detected in a fraction of a second by new instrument are used to control and record temperature in induction heating applications. The story is in STEEL article "How You Can Control Temperatures in Induction Heating."

90. Oxygen-Enriched Blast

"Oxygen-Enriched Blast Steps Up Bessemers" is title of STEEL article which summarizes advantages of oxygen-enriched blast as pointed up in reports given at the American Iron and Steel Institute general meeting. Report on carbon lined blast furnaces which favors use of carbon brick below mantle is also discussed.

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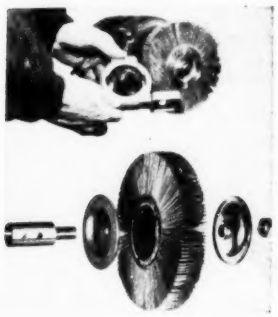
flaws from contours without danger of digging into the stock. Wheel is 6½ inches in diameter, 1 inch wide and is available in a variety of grits from coarse to very fine. It may be used stationary or portably for all types of light grinding and deburring on irregular surfaces, and no extra skill is required.

Mounting arbor is provided for



attaching the wheel to any standard plain or threaded shaft or for chucking in ¼ or ½-inch chucks. The wheel attaches to any rotating spindle, weighs 8 ounces, and a 1/6-hp motor is sufficient for normal driving purposes. Merit Products Inc., Dept. ST, 4023 Irving Place, Culver City, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Mechanical Time Delay Switch

. . . air flow controls action

Used in applications where a mechanically or manually initiated time delay is needed, the Agaswitch is operated by a lever rather than by solenoid action as in the case of the company's Type 2 Agastat. Pressure against the lever trips the switch, and a time delay period from 0.1 second to 5 minutes or more starts upon release of pressure on the lever.

Available in both single-pole double-break, and double-pole single-break types, for resistance

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Just circle the corresponding number of any item in this section for more information.

NILSON FOUR-SLIDE

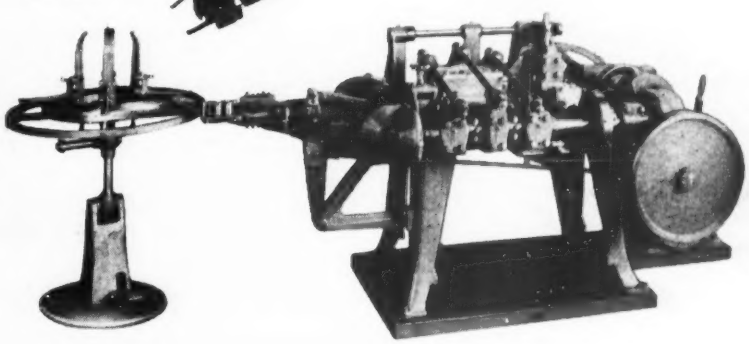
It's easy to get HIGH PRODUCTION . . . and UNIFORMITY, too!

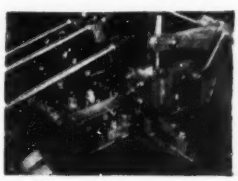
Wire and Ribbon Metal FORMING MACHINES

UNIFORMITY in automatic production doesn't come by chance! In the case of wire and ribbon stock forming on NILSON 4-SLIDES, *it means control of the material from the coil to the final form.*

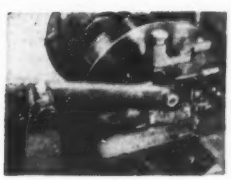
Parts, such as illustrated, are produced to tolerances of .002 at critical dimensions. Dies and forming tools, once installed (faster and simpler with NILSON'S open construction) maintain close tolerances for short and long runs. One machine! One set-up! Increased production! Maximum uniformity!

Model SF3 NILSON 4-SLIDE, shown below, with No. 51B Tilting Stock Reel, is a complete unit that can be set-up in any convenient location.





Close-up of the NILSON forming section with the built-in Horizontal Press to the left. This design eliminates secondary handling and insures product uniformity because the sequence of stamping and forming is automatically controlled.



Close-up of the NILSON feed mechanism . . . capable of feeding wire and ribbon metal to tolerances of .001. Another important element in insuring product uniformity. Positive control is maintained over the material regardless the length of feed.

Range of sizes

Wire Forming
1/32" through ½" wire. Feeds up to 32".

Ribbon Stock Forming
1" through 3½" wide material. Capacity of press section 5 to 30 tons; 50 to 75 tons in heavy duty types.

For specific recommendations — send details of your operation.

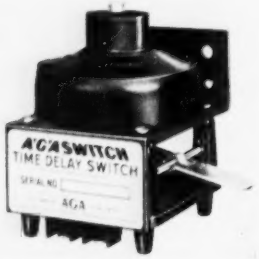
THERE'S NOTHING LIKE A NILSON

NILSON has been specializing in Forming Equipment for over 50 years.

THE A. H. NILSON MACHINE COMPANY
1512 Railroad Avenue • Bridgeport 5, Connecticut
CHICAGO • CLEVELAND • DETROIT • LOS ANGELES • HAMILTON, ONT., CANADA

Automatic Chain-Making Machines • Automatic Staple Forming Machines • Wire and Stock Reels • Foot Presses • Wire Straightening Equipment • Slide Feeds for Presses

loads of approximately 15 amps at 115 volts, 60 cycles, the switch is light in weight and it measures 2½ inches square by 3 inches high.



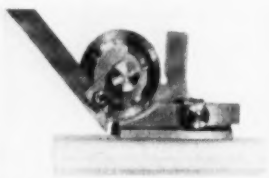
Time delay is obtained by restricting air flow through an adjustable orifice in the timing head. Elastic Stop Nut Corp. of America, Dept. ST, 1027 Newark Ave., Elizabeth 3, N. J.

FOR MORE DATA—CIRCLE REPLY CARD NO. 12

Universal Bevel Protractor

. . . acute angle attachment

Stainless steel universal bevel protractor with vernier has an acute angle attachment for fast acute angle setting. Detachable



base keeps the tool in an upright position at all times. Protractor gives readings over full 360 degrees, accurate to 5 minutes.

Acute angle attachment attaches to base line of the protractor, from which all graduations are taken, eliminating accumulated errors. Mercury Supply Co., Dept. ST, 410 Fairview, Elmhurst, Ill.

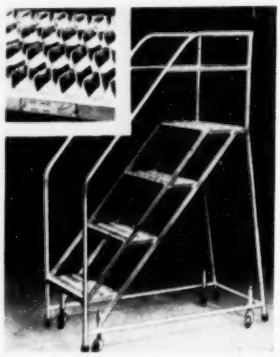
FOR MORE DATA—CIRCLE REPLY CARD NO. 13

Tread For Safer Footing

. . . steel is raised and serrated

Heavy gage steel is cut, punched, raised and serrated to form a new design safety tread for ladders and work platforms. Regardless of types of footwear, and whether the soles of workers shoes are oil or water-soaked or dry, the serrated edges furnish positive non-slip foot grip.

Tread also cleans the soles of workers shoes and is itself self-cleaning. Metal chips or fragments are scraped from shoe soles and the objects removed merely dropped through holes in the tread. New tread is optional on ladders of one to eight steps with safety



handrails, and of one to three steps without handrails. Ballymore Co., Dept. ST, Wayne, Pa.

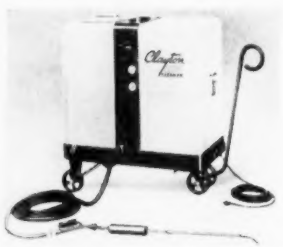
FOR MORE DATA—CIRCLE REPLY CARD NO. 14

Low-Cost Steam Cleaner

. . . full pressure in 2 minutes

Capable of discharging 150 gallons of balanced cleaning solution per hour at cleaning pressure extending from 30 psi, for such jobs as paint stripping, to 100 psi, for the rapid cleaning of heavily encrusted or grease-coated parts and surfaces, this steam cleaning machine meets the need for low-cost equipment. Carefully designed heating coil provides a guaranteed thermal efficiency of 75 per cent minimum. Full working pressure is attained in two minutes from a cold start.

Automatic overheating protec-



tion is provided by thermostat controls which cut off the fuel supply to the burner in the event of excessive pressure or temperatures due to water supply failure. A wide variety of models is available: Oil-fired and gas-fired; electrically driven and gasoline engine driven; portable, stationary or trailer. Each can be equipped with remote nozzle control. Solution tank holds 15 gallons, and each model is equipped with 25 feet of hose with a swivel-handle gun. Clayton Mfg. Co., Dept. ST, Box 550, El Monte, Calif.

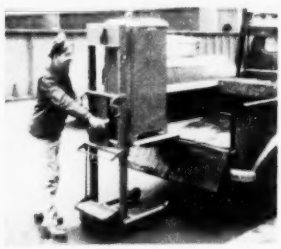
FOR MORE DATA—CIRCLE REPLY CARD NO. 15

Handy Hydraulic Hoister

. . . has faster lift rate

Materials handling involved in maintenance work around the plants is simplified by this new Handy Hoister. Unique feature is the planetary gear winch operation which lifts faster, requires less total effort, permits smooth precise load leveling. Each revolution of the crank lifts a 500-pound load 3 inches, maintaining the lifted position without slipping. The entire mechanism is enclosed in a dustproof, moistureproof drum assuring trouble-free precision performance at all times.

Standard lifting platform can be



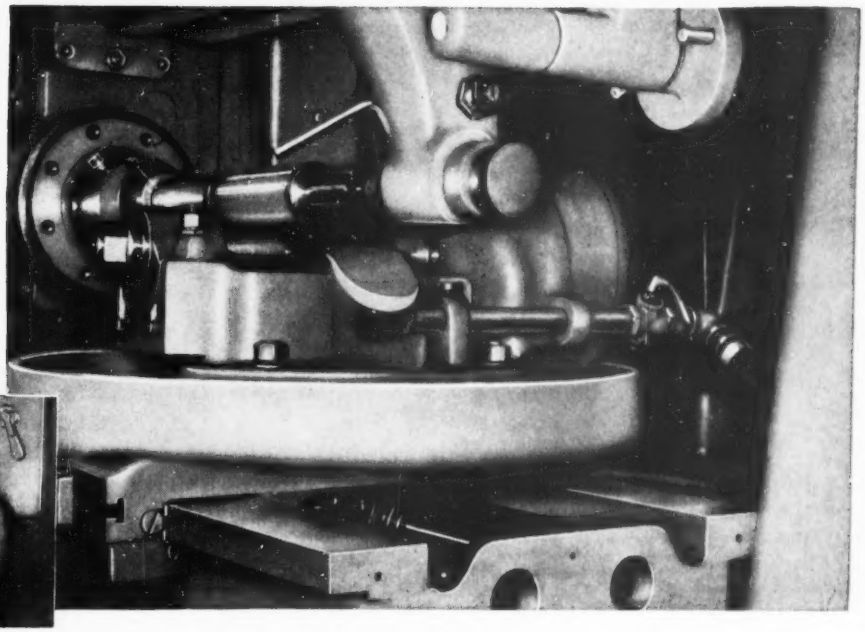
replaced by a lifting arm for handling coils, a cradle type platform to hold rolls securely in place, a roller platform for easier removal of loads, or forks of required shape and length. The 500-pound capacity model has a standard platform size of 24 x 24 inches; the 1000-pound model has a platform 30 x 24 inches. Lewis-Shepard, Dept. ST, Watertown, Mass.

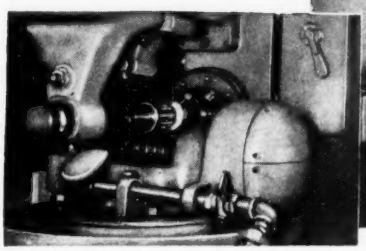
FOR MORE DATA—CIRCLE REPLY CARD NO. 16

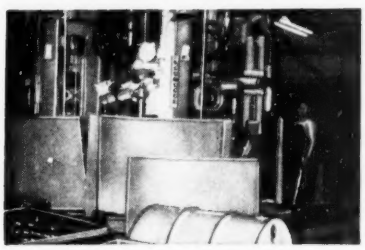
Portable Pipe-Tube Cutter

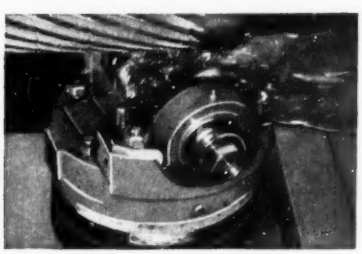
. . . has power-driven rollers

Power driven rollers make this one of the fastest, cleanest pipe, tube and conduit cutters of its type. Ideal for on-the-job cutting in both









"ON-THE-JOB" CUTTING OIL TESTS BY CITIES SERVICE ENGINEERS!

at Timken-Detroit Axle Company

TOOL WEAR REDUCED 25%...MANUFACTURING COSTS ALSO CUT!

In an effort to reduce tool wear and cut manufacturing costs, the Wisconsin Division of Timken-Detroit Axle Company at Oshkosh called in Cities Service Engineers to make "on-the-job" tests.

Cities Service Lubrication Engineers made an on-the-spot study of the Timken-Detroit operation. This "on-the-job" evaluation by skilled Cities Service Engineers, long practiced in solving like problems, resulted in a recommendation for the use of a Chillo Cutting Oil that actually reduced tool wear 25% with proportionate savings in manufacturing costs!

WHAT ARE YOUR PROBLEMS? Why not take advantage of free, "on-the-job" testing? Call for our lubrication engineers at the office nearest you, or write Cities Service Oil Company, Dept. G18, Sixty Wall Tower, New York City 5, New York.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

WHEN IT COMES TO

SPECIALTIES

COME TO

WALLINGFORD

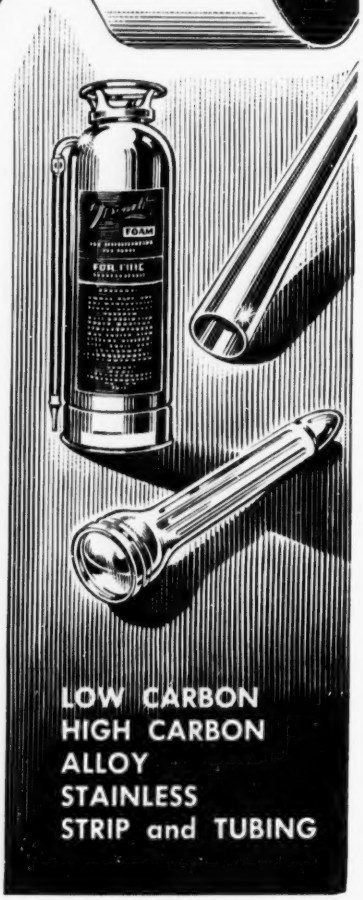
FOR THE

Stainless

STEEL

Strip

Cost-Minded
Production
MEN
Specify
Wallingford Steel
because . . .
They Know It
Gages Uniformly,
Is Correctly Tempered,
Draws Easily,
Punches Cleanly
and
Lot after Lot
is a
Consistently Dependable
Product
Available
.002 and heavier



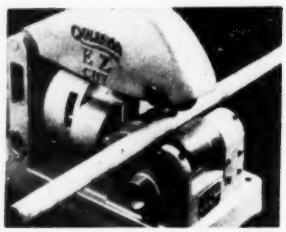
LOW CARBON
HIGH CARBON
ALLOY
STAINLESS
STRIP and TUBING

THE
WALLINGFORD
SINCE 1922
STEEL
CO.
WALLINGFORD, CONN., U.S.A.

NEW PRODUCTS and equipment

large and small shops, the E-Z cutter's power-driven rollers revolve around the pipe. Cutting is continuous, slippage is eliminated and a single sharpening of the cutter gives thousands of clean, fast cuts.

Adjustable roller-type supports allow any length and size of pipe



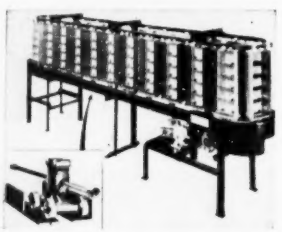
to be cut without changing the supports. Cutter handles pipe from ⅜-inch to 2 inches and tubing from ⅝-inch to three inches. Foot control switch leaves operator's hands free to handle work. Complete weight is only 100 pounds. Gaines-Collins, Dept. ST, 5474 Alhambra Ave., Los Angeles 32, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 17

Table-Cable Conveyor

. . . offers installation versatility

Pallets, shelved trays, fixtures, rotators and other devices can be attached to this table-height, power-driven cable conveyor. Four-wheel carriers attached to a ⅜-inch steel cable run in formed steel



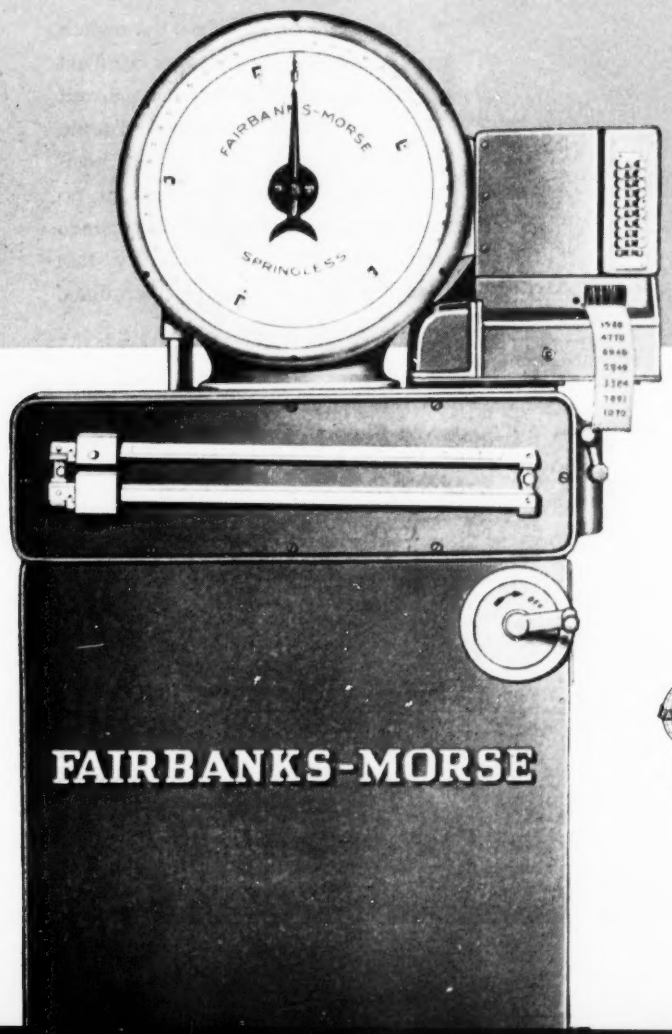
channel track and can turn horizontal corners around sheave diameters of 15, 19, 26⅝, 30½ or 38⅛ pitch diameter and through vertical inclines as desired. Trolleys are positioned permanently by exclusive Bush-Lock bushings which are swaged onto the cable under high pressure.

Although designed as a table-height conveyor which allows the placement of lights, tools, paint spraying equipment and the like

1938
4770
6848
2949
3384
7893
1070

Keep your weights a matter of record

Automatically!



Rule out the chance for weighing errors with a Fairbanks-Morse Dial Scale with Printomatic Recorder. You save annoying, costly receiving and shipping disputes—you have a permanent record of each article weighed *automatically!*

The Printomatic is designed so that other pertinent information may also be printed with the weight for accounting or identification purposes. And, there's an electronic control for materials handling and processing.

See your local Fairbanks-Morse Scale Specialist about the Printomatic Recorder . . . and his complete line of scales of all types. Fairbanks, Morse & Co., Chicago 5, Illinois.

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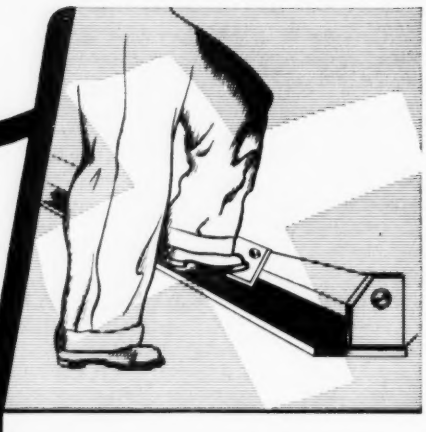
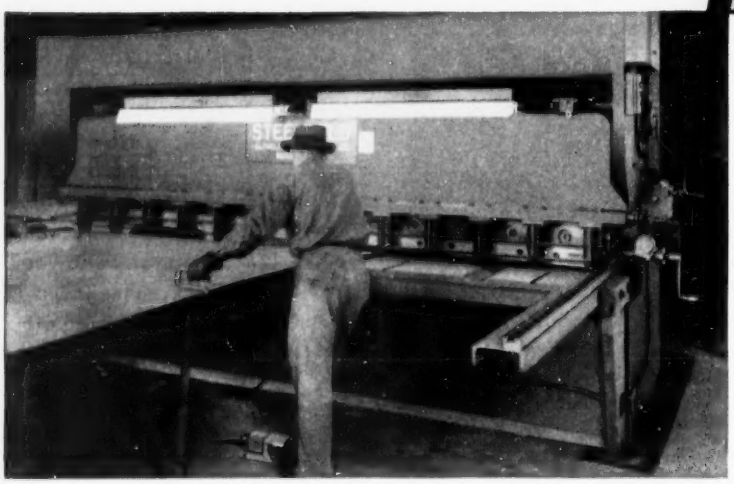
a name worth remembering when you want the best

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES
ELECTRICAL MACHINERY • RAIL CARS • HOME WATER
SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

TOE CONTROL ELIMINATES KNEE ACTION



ELECTRIC FOOT SWITCH REDUCES FATIGUE - SPEEDS SHEARING



● The operator can slide the switch around the floor to wherever handiest to use. A mere touch of the toe and the knife is set in motion. Electric toe control is standard on all Steelweld Shears and furnished at no extra cost. It enables shearing speeds not attainable with ordinary foot treadles for many cutting operations.

● If you have spent a day at a shear with the old mechanical foot treadle, you know what knee action is. As the hours roll by it grows more and more tiresome, fatiguing, and production slips accordingly.

At last something has been done about it. Electric foot switches have been adopted as standard equipment for Steelweld Shears. Knee action has been replaced by fast easy toe control.

Toe control is one of many outstanding features you get on Steelweld Shears. These machines are in a class by themselves. Learn what they can do for you.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7814 East 282nd Street, Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS

directly overhead, conveyor can be inclined to higher elevations and floor or ceiling mounted. E. W. Buschman Co., Dept. ST, 4401 Clifton Ave., Cincinnati 32, O.

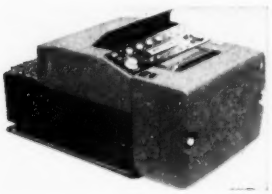
FOR MORE DATA—CIRCLE REPLY CARD NO. 18

Multiple Recording Oscillograph

. . . circuitry prevents data loss

Fifty active data traces can be accurately recorded on 12-inch paper or film by this Type 5-119 recording oscillograph. A 36-trace type with identical features is also available. Records 250 feet in length may be made at speeds from 0.10 to 100 inches per second.

Automatic safety circuits are incorporated to give immediate warning should some failure occur to



cause record loss. Reserve lamps begin immediate operation in the event of main record lamp failure, to check condition of main and reserve lamps, timing lamp, heater operation and paper supply. Additional test circuits check the warning systems. Frequencies from 0 to 3000 cps may be recorded by installing precision galvanometers. Models operate from either 26-volt dc or 115-volt ac power. Total weight of the 5-119 is 145 pounds. Consolidated Engineering Corp., Dept. ST, 300 N. Sierra Madre Villa, Pasadena 8, Calif.

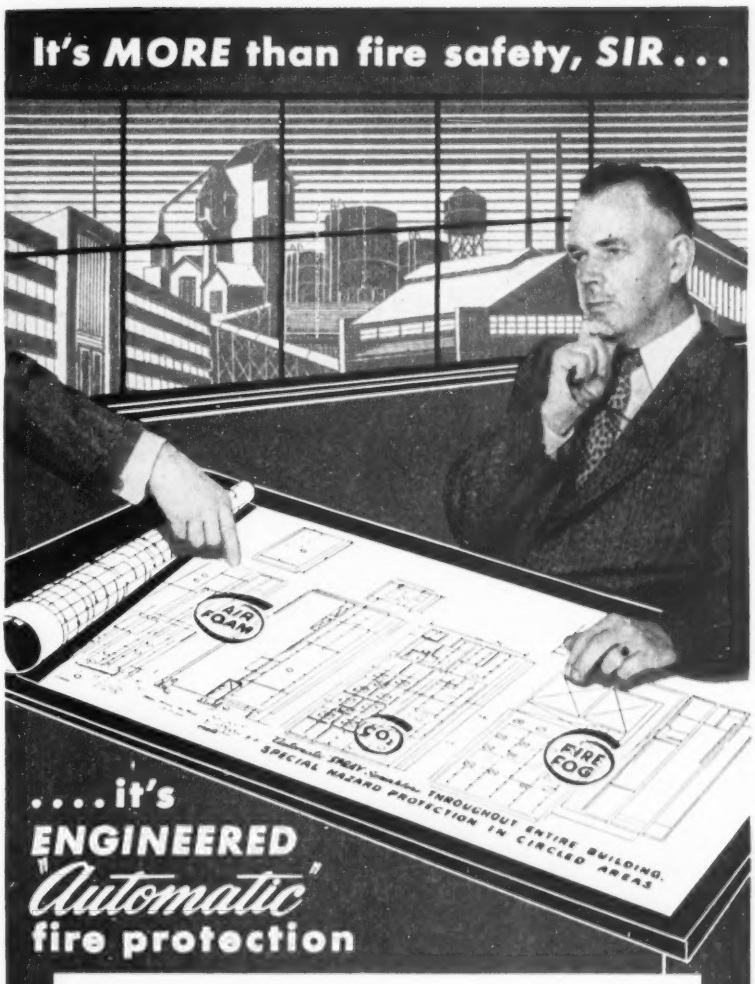
FOR MORE DATA—CIRCLE REPLY CARD NO. 19

Profiler For Carbide Dies

. . . good for repairs, alterations

Tungsten carbide dies can be repaired, altered or even produced from blanks of presintered carbide with this Di-Profiler. Operation is vibrationless, even when used at long stroke which may be adjusted from 0 to 0.250 inch. Full ball bearing construction and precision eccentric balancing construction are responsible.

Action is reciprocating or oscil-



When it comes to the planning of fire protection for your plant or business, there's considerably more to be viewed than the price. Of course, you will want to be fully informed on the economics of protecting your property, but it's equally important to know that the method of protection is the best available for any given area of your building.

It is for that reason that through the years we have not limited ourselves to the design and installation of only certain types of protection. Like you, we study the economic factors involved. Then, following a thorough investigation of all elements of your overall fire safety problem, we design, manufacture and install the type of protection *best by test* for maximum safety. It's *engineered* "Automatic" FIRE PROTECTION for you . . . the finest available at any price!

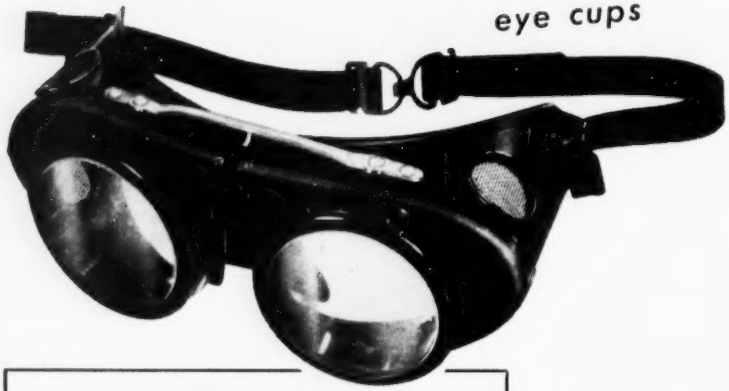
Why not find out how *engineered* "Automatic" FIRE PROTECTION can save dollars for your business whether you ever have a fire or not. Remember, what's worth insuring is worth protecting.

Write for Bulletin 66, the ABC of Fire Protection. It's FREE.

"Automatic" Sprinkler
CORPORATION OF AMERICA
YOUNGSTOWN, OHIO
Offices in principal cities of North and South America

NEW WILLSON Kover-Mor Goggles

with strong, lightweight nylon eye cups



Fit easily over modern prescription glasses— use standard 50 mm. round lenses

They offer many benefits to workers in hazardous occupations—

improved design . . . provides snug, comfortable fit—ample room over modern, large-frame prescription glasses.

nylon eye cups . . . molded of tough lightweight nylon—strongest plastic used in goggle cups; non-flammable—and won't conduct heat.

standard lenses . . . 50 mm. round flat Super-Tough* lenses used eliminate need to stock odd size replacement lenses—external lens retaining ring makes lens replacement quick and easy.

extra ventilation . . . two-way ventilation is provided by slots in retaining ring and screens in eye cups.

new lightweight comfort . . . total weight of these new goggles is practically the same as smaller "cover all" styles.

NOTICE THE RIGID METAL TOP BAR

—standard on Willson Kover-Mor Goggles. Makes them easier to handle—holds them firmly in place.

Ask your Willson distributor for new Kover-Mor* Cup Goggles

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More Than 300 Safety Products Carry This Famous Trademark

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NEW PRODUCTS and equipment

lating, to the amount desired and, when used with spindle attachment, finely-controlled rotary action is obtained. Can be used

with full line of diamond files and burs. Book of techniques is included only with actual shipment of the profiler. Nord International Corp., Dept. ST, P. O. Box 44-N128, Denville, N. J.

FOR MORE DATA—CIRCLE REPLY CARD NO. 20

Rock Type Dump Body

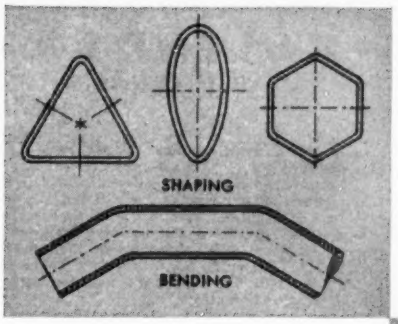
. . . eliminates all side bulging

Designed especially to withstand the hard shock of power shovel, chute and conveyor loading, this new unit is available in from 5 to 15-yard sizes. Body is constructed throughout of heavy steel and features extra wide box-type side bracing, both horizontal and vertical, on the head sheet and sides.

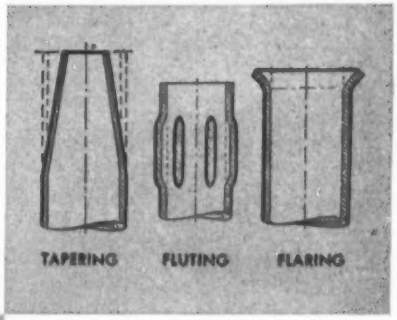
Design eliminates side bulging, common cause of heavy duty body failures. Compartment is amply protected by a sturdy, box-braced, full sized cab protector.

Need for a tailgate is eliminated by the 15-degree angle scow-type rear end, supported by angular box braces. A special device mounted on each side of the truck body and hoist frame absorbs damaging warp and strain and is said to greatly reduce body maintenance expense. Galion Allsteel Body Co., Dept. ST, Galion, O.

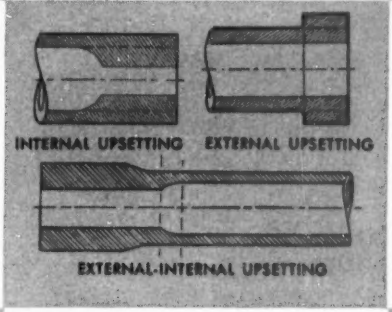
FOR MORE DATA—CIRCLE REPLY CARD NO. 21



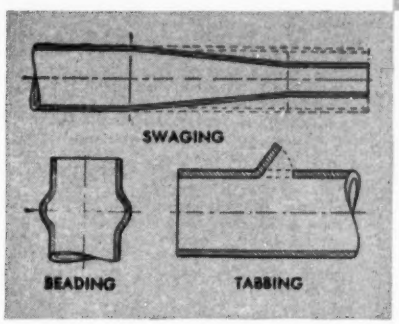
OSTUCO TUBING is versatile!



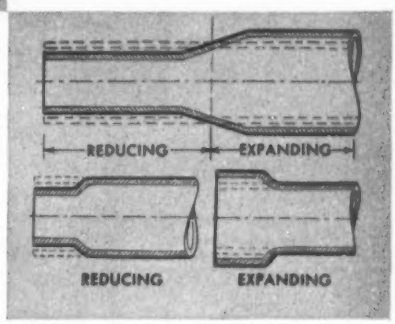
OSTUCO TUBING is versatile!



OSTUCO TUBING is versatile!



OSTUCO TUBING is versatile!



you draw the blueprint . . . we'll deliver the goods

There's practically no limit to the things OSTUCO can do with Seamless and Electric Welded Steel Tubing to help you produce lighter, stronger, better looking products at lower cost. Only a few of the operations are shown above.

Newly expanded and modernized facilities for *manufacturing, forging,* and *fabricating* tubing, all in one plant — plus our own steel source as a member of the Copperweld family —speed deliveries, assure highest quality and save you money.

Tubing is our business, not a side line. OSTUCO's unique "Single Source" operation, with unified production control, eliminates shipments from one location to another . . . greatly reduces rejects . . . prevents errors . . . puts an end to buck passing and red tape. You write one order, get one bill, and responsibility is clearly fixed. Write for informative catalog, "Ostuco Tubing."

From Your Blueprint . . . to Your Product
OSTUCO TUBING
Tapering • Swaging • Flanging • Bending
Upsetting • Expanding • Reducing • Beading
End closing • Spinning • Drilling • Slotting
Notching • Flattening • Shaping • Trimming
Threading • Angle Cutting • And Many Others

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company
Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing
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CALENDAR
OF MEETINGS

July 23-24, Truck-Trailer Manufacturers Association Inc.: Annual summer meeting, Edgewater Beach hotel, Chicago. Association address: 1024 National Press Bldg., Washington. Managing director: John B. Hulse.

August 17-19, Society of Automotive Engineers: International West Coast meeting, Georgia hotel, Vancouver, B. C. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 19-21, Institute of Radio Engineers: Western electronic trade show and convention, Civic auditorium, San Francisco. Business office: 1355 Market St., San Francisco 3. Business manager: Heckert Parker.

August 23-26, National Automatic Merchandising Association: Annual convention and exhibit, Hotel Conrad Hilton, Chicago. Association address: 7 S. Dearborn, Chicago. Secretary: C. S. Darling.

September 1-4, American Institute of Electrical Engineers: Pacific general meeting, Hotel Vancouver, Vancouver, B. C. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

September 6-11, American Chemical Society: Fall meeting, Hotel Conrad Hilton, Chicago. Society address: 1155—16th St., NW, Washington 6. Assistant secretary: R. M. Warren.

September 10-12, Rocky Mountain Management Club: Rocky Mountain industrial exposition, University of Denver arena. Club address: 1031 15th St., Denver 2. Executive secretary-treasurer: Harold S. Craig.

September 13-16, Electrochemical Society Inc.: Fall meeting, Ocean Terrace hotel, Wrightsville Beach, N. Carolina. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

September 14-15, American Hot Dip Galvanizers Association, Inc.: Semi-annual meeting, Statler hotel, Cleveland. Association address: 1506 First National Bank Bldg., Pittsburgh 22. Secretary-treasurer: Stuart J. Swensson.

September 14-16, Allied Railway Supply Association: Annual meeting, Hotel Sherman, Chicago. Association address: 1200 W. Chase Ave., Chicago 26. Secretary: Charles F. Weil.

September 20-23, Packaging Machinery Manufacturers Institute: Annual meeting, Skytop Lodge, Skytop, Pa. Institute address: 342 Madison Ave., New York 17. Secretary-treasurer: Helen L. Stratton.

September 20-23, American Institute of Wholesale Plumbing & Heating Supply Associations Inc.: Annual convention, Hotel Waldorf-Astoria, New York. Institute address: 402 Albee Bldg., Washington. Executive secretary: George T. Underwood.

September 21-22, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

September 21-23, Truck Body & Equipment Association Inc.: Annual meeting, Sheraton-Gibson hotel, Cincinnati. Association address: 1122 DuPont Circle Bldg., Washington 6. Executive manager: Arthur J. Nuesse.

September 21-24, American Mining Congress: Annual metal and nonmetallic mineral mining convention, Olympic hotel, Seattle. Congress address: 1102 Ring Bldg., Washington 6. Executive vice president: Julian D. Conover.

September 21-25, Instrument Society of America: National instrument conference and exhibit, Hotel Sherman, Chicago. Society address: 1319 Allegheny Ave., Pittsburgh. Manager: P. V. Jones Jr.

September 23-26, National Association of Foremen: Annual convention, Milwaukee. Association address: 321 W. 1st St., Dayton 2, O.

September 28-October 1, Association of Iron & Steel Engineers: Annual meeting, Hotel William Penn, Pittsburgh. Association address: 1010 Empire Bldg., Pittsburgh. Managing director: T. J. Ess.

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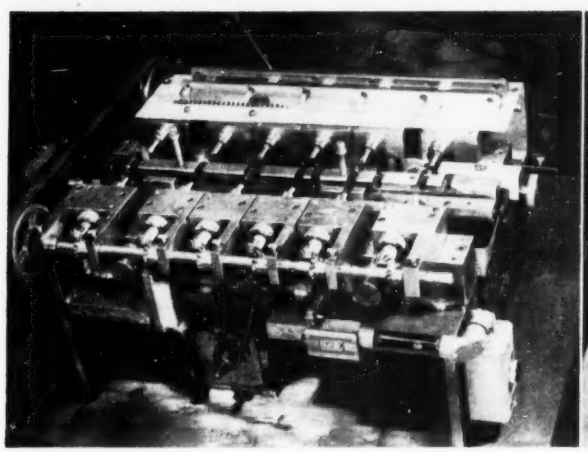

Closeup of the AMF-designed boring machine with cover plate removed shows bevel gear drive off one shaft. A drilled and reamed rack is shown on other cover plate

Operator checks tolerances with a gage plug. Holes must be +0.0005, −0.0000-inch and must be parallel within 0.0015-inch in two inches. Parts are AISI 2350 steel

Savings Pay For Short-Run Machine

Steering away from a special machine for limited production isn't always the best course. AMF found they were ahead by building two-way boring machine for 3000 pieces

SOMETIMES the savings from end-product improvement alone can justify relatively heavy tooling expenditures for a short-run production job.

Possibility of a custom-built machine is often overlooked when trying to solve short-run machining problems, yet it may be the simplest answer of all.

They Did It — Engineers at American Machine & Foundry Co.'s Brooklyn, N. Y., plant found it can be done—and economically, too. Their problem was to drill and ream six pairs of holes in AISI 2350 steel, hardened to Rockwell 35 C scale. Tooling costs had to be amortized over 3000 pieces!

Pairs of holes are actually two holes in line, with about 1½ inches between them. Hole diameter is 0.375-inch (+0.0005, −0.0000) and the two holes have to be parallel within 0.0015-inch in two inches. Pairs must be in line so that a 0.3748-inch diameter check pin will pass through both.

First Try—Job consists of 3000 pieces including four different but similar parts, processed in lots of about 50 units. Originally the job was tried in a conventional drill jig, drilling and reaming entirely from one side. Drill bushings were put above the top hole and between the two holes.

This method proved impractical because chips clogged up the lower bushing. Resultant holes had everything: They were rough, tapered, out of round, off-size, and not parallel. Spoilage ran about 20 per cent.

A jig borer was also tried, but lack of speed was a disadvantage. The operation took 50 minutes and every fourth piece had to be checked by an inspector.

Keep It Simple—Analyzing the job, AMF engineers decided to design and build a special 12-spindle two-way boring machine to do the finish boring. Original drill jig is used for roughing only.

Recognizing the limited number of parts to be processed, the drill jig was left unaltered and the boring machine made as simple as possible, even at the sacrifice of minimum cycle time.

Hasty Write-Off — "Resultant design has proved itself on the job," says T. R. Dreyer, Works Manager. "Our large reduction in scrap plus a gain in speed over a jig-bore setup will permit us to amortize total cost of the machine over the 3000-piece run."

James E. McConnell, Chief Manufacturing Engineer, feels that "success of the machine revolves around design of the spindles." The 12 spindles are each mounted in a cage of 30 ball bearings, arranged spirally around the spindle. A thrust bearing takes the end load.

Spindle Shift—Hole for the boring bar is located on an eccentric; thus a slight rotation of the bar in the spindle permits a small adjustment for size of hole bored.

Since the job consists of four slightly different parts, three spindles on each side must be adjustable laterally, while the other three are stationary. Each spindle block is located by two special screw dowels and held in place with socket-head screws. Dowels are in effect stepped ¼-inch pins with ⅜-inch 16 thread at one end

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so that dowel is extracted as screw is removed. Arrangement avoids need to dismantle whole drive shaft system to pry spindle blocks free of the dowels when blocks are moved to new location.

To and Fro—Spiral bevel gears on the shaft can be realigned also by loosening set screw and sliding gears along the shaft. Both banks of spindles turn in same direction, when viewed from ends of respective spindles. This permits use of "right hand" tools on all spindles. The two spindle drive shafts are driven by single V-belt directly from ¾-hp single-phase motor at 1725 rpm.

Workpieces are mounted on movable carriage between banks of spindles. Side location is by lengthwise key in carriage that fits into accurately machined lengthwise groove in work piece. Endwise location is against stop block which can be mounted in several places to accommodate the various types of workpiece. Part is clamped down by single strap running full length of part.

Six at a Time—In operation the work feeds from mid-position to one side, boring six holes on that side. At end of carriage travel a microswitch is tripped and carriage feeds back to other side to bore the other six holes.

Another limit switch returns carriage to midpoint for unloading and reloading. Microswitches used to control shuttling of carriage actuate 1/6-hp three phase 1725 rpm reversing motor.

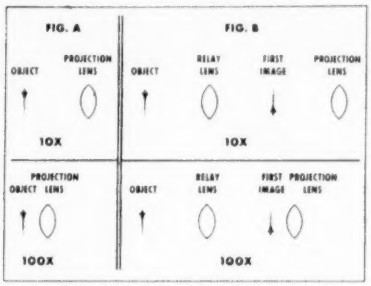
Speed and Feed—With a feed of 0.002-inch per revolution and spindle speed of 900 rpm, complete cycle time is 2.3 minutes. This could have been reduced somewhat by incorporating rapid traverse into the machine design, but limited over-all production run made this expenditure uneconomical.

Compactness of the machine is demonstrated by its dimensions: 14 x 20 inches. AMF engineers find their custom-tailored unit achieves satisfactory machining time and low reject rate. Their advice: Don't shy away from considering a machine tailored to the job, but always keep in mind the balance between necessary expenditures and their ceiling, set by the short production run.

Plain Pointers on Projection

ALTHOUGH we frequently speak of magnifying an object 100× with the Kodak Contour Projector, technically we do not magnify the object at all. Instead we magnify its image, as formed by a relay lens. This relay system, diagrammed in Fig. B, forms an image of the object at a ratio of 1 to 1. The magnifying optics in turn pick up this image and enlarge it from 10 to 100 times.

Since the end result is the same—an enlarged image of a part on the screen—this might seem a roundabout system to the uninitiated. On the contrary, there are logical mathematical reasons for it. One of the more restrictive factors in conventional optical systems is expressed by the formula, M = id/od; that is, magnification equals the ratio of the image distance to the object distance. In practice, where image distance is limited, this entails using lenses of short



focal length for high magnifications. The lens is moved close to the work, decreasing object distance and unfortunately decreasing at the same time the size part which may be checked (Fig. A).

It was to overcome this limitation that our optical experts incorporated the relay system in the Kodak Contour Projector. Since this system merely images the part at unity, the focal length of the relay lens can be comparatively long—in this case eight inches. And the magnifying optics can be moved as close as desired to the image formed by the relay. As a result, users of our projector have a full eight inches in which parts may be staged, regardless of the magnification desired. This permits checking form tools, shafts, and other bulky parts.

If this were all that the relay accomplished, it would be justified design wise. However, it also makes it practical to incorporate in the projector a lens turret in which lenses of varying magnifying power may be mounted. With such a turret, magnification is changed by merely twisting a dial and the part remains in focus at the new magnification. This is a handy feature, and only one of a number of optical features of the Kodak Contour Projector to be discussed in this space.

You can inspect long parts at all magnifications ...with the Kodak Contour Projector

THIS seven-inch-long cycle timing part must be inspected for tooth contour, location and spacing of two cams, shaft diameter, shoulder spacing, and form, size, and runout of the lead screw. All these dimensions may be quickly checked on the Kodak Contour Projector. That's because the Kodak Contour Projector provides an unvarying 8" clearance between lens and object at all magnifications. (The column at the left tells you why.)

The exceptional versatility of the Kodak Contour Projector permits this part to be completely inspected in six positions, at several different magnifications, and using both surface illumination and silhouette projection. And the job requires little training, is done quickly and easily.

Whether for toolroom use or production assembly and inspection, you'll find a Kodak Contour Projector will get the work out in a hurry. With an appropriate chart-gage and fixture you can inspect all sorts of complex parts, large and small. There is a field representative in your area who will answer your questions. To get in touch with him, or for a copy of a new booklet, "Kodak Contour Projector," write to:

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Close Look At Vanadium

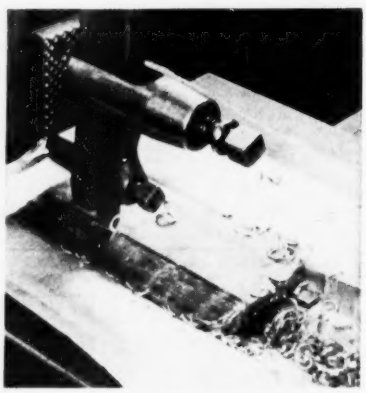
Study of mechanical properties of high-purity vanadium suggests broader usage for metal

LIGHT has been shed on less known mechanical properties of ductile vanadium through the work of C. M. Brown, Electro Metallurgical Co., Niagara Falls, N. Y.

Among properties noted by Brown are:

Pronounced yield point in tension such as is found only in mild steel among the common materials of construction.

High capacity for cold-work, which allows large cold reductions



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. . . accurate dimensions, fine surface

to be made without necessity of annealing to restore ductility and reduce hardness.

Considerable elevated temperature tensile strength suggestive of utility in certain cases where load carrying ability is required above the normal temperature ranges usually encountered.

Existence of a critical transition temperature range in which fracture of the metal under restrained conditions, as in a notched impact bar, changes from a ductile to a brittle type.

Tensile Strength — Tensile data for cold-rolled vanadium strip show that, after 75 per cent cold reduction, tensile strength has reached only 113,000 psi, with 5 per cent elongation. This compares with an annealed strength of about 70,000 to 75,000 psi and 25 per cent or more elongation.

Annealing data show good ductility is restored and strength is

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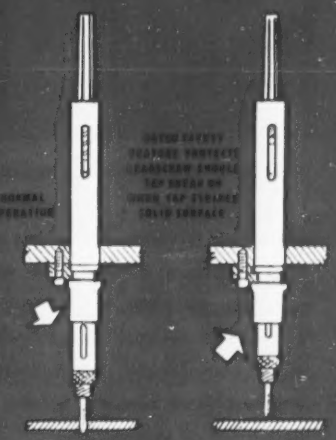

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reduced by heating at 1472° F. Heating to 1652° F provides little additional benefit, while heating to only 1112° F usually accomplishes relatively little as far as improving ductility is concerned. Metallographic examination shows recrystallization occurs at about 1472° F.

Cold Work—Vanadium does not work harden excessively. In pure form, vanadium is notable for its ability to absorb large amounts of cold reduction. It's not unusual to cold-roll over 90 per cent, without intermediate anneals. Reductions of 98 to 99 per cent have been readily obtained. A 3-mil wire, for instance, has been drawn from ¼-inch diameter rod, without intermediate annealing.

Vanadium's ability to be cold rolled depends on composition with

MORE HIGH-PURITY VANADIUM
. . . ingots, plates and strip

respect to contaminating elements. Cold work is readily accomplished when oxygen and nitrogen are kept relatively low. Larger amounts of these contaminants reduce cold workability.

High Temperatures—In view of possible applications of vanadium in the absence of a reactive atmosphere, short-time tensile tests were made in a helium atmosphere at temperatures up to 1832° F.

Results indicate a tendency for strength to increase slightly up to about 752° F, and to decrease at higher temperatures up to 1832° F. Tensile strengths up to about 1112° F are higher than values generally ascribed to Type 304 stainless steel over the same temperature range. From 1112 to 1832° F, strength of

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vanadium is about the same as Type 304. Elongation and reduction in area values are at least equal to Type 304 at temperatures above 932 or 1112° F.

Impact Tests—To determine susceptibility of vanadium to brittle fracture, standard V-notch Izod impact tests were conducted on a number of heats. Preliminary tests were conducted at room temperature, and then at higher or lower temperatures to locate the temperature of transition from ductile to brittle fracture. Value of 40 ft-lb was chosen arbitrarily to represent the transition point.

Heat V280, for instance, had the lowest transition temperature — about −76° F. Sample contained 0.07 per cent C, 0.07 per cent O, 0.004 per cent H and 0.04 per cent N. On the high side, heat V285 had a transition temperature of 338° F. It contained 0.13 per cent C, 0.08 per cent O, 0.006 per cent H and 0.06 per cent N.

Contaminants — Brown also reports general observations concerning effectiveness of contaminating elements (carbon, oxygen, hydrogen and nitrogen) in controlling the ductility of vanadium.

In all cases where carbon, oxygen and nitrogen are less than 0.1 per cent, properties are fairly consistent. With one exception, yield points lie between about 50,000 to 65,000 psi, tensile strengths between about 60,000 and 75,000 psi, with a minimum elongation of about 25 per cent, minimum reduction in area about 65 per cent and a maximum hardness of about 80 Rockwell B. These data demonstrate that vanadium lacks a high tendency to work harden. Values of reduction in area much higher than elongation are typical of this behavior.

In general, experience indicates that both oxygen and nitrogen should be below 0.12 to 0.16 per cent for satisfactory cold reduction. Notched bar impact behavior is much more affected by contamination than are simple tensile properties.

Caustic Soda Cleans Dies

Dimple die cleaning has been shortened from an eight-hour-a-week undertaking to an easy 10-minute job at Temco Aircraft Corp., Dallas, Tex.

Here's how: Mix caustic soda and water at a cup-to-a-gallon ratio. Heat mixture to 200° F in a glass or steel container on a hot plate. Drop dirty dies into mixture, and 2 to 10 minutes later, take them out. Rinse in plain water and dry with a rag.

Solution won't damage chrome, iron or steel. Dirty dies in fact, may be soaked in the solution overnight, or indefinitely, without danger. Magnesium is the only metal found to be vulnerable to the eating action of caustic soda solution.

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Largest steel casting ever poured in Canada has been delivered by Dominion Foundries and Steel Ltd., Hamilton, Ont., to Dominion Engineering Works Ltd., Montreal.

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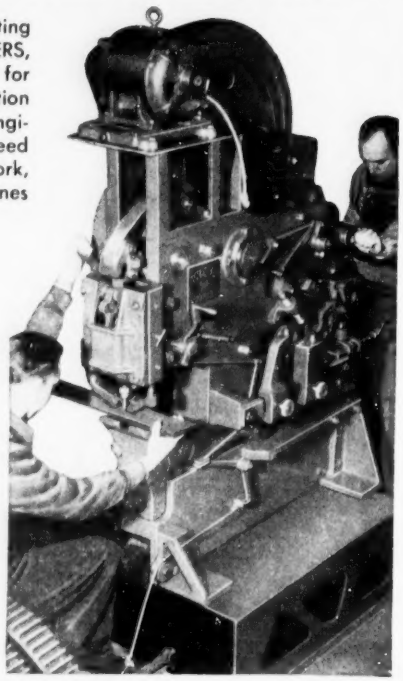
The punch may be operated at the same time as either the section cutter, bar cutter, shear or the coping and notching attachment . . . therefore, two operators can work at this machine simultaneously without interference. For illustrated literature and prices, write Dept. D.



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Apron shield worn by a grinding machine operator at Lockheed Aircraft Corp., Burbank, Calif., will stop a 38-caliber bullet fired only 8 feet away. Weighing less than 3 pounds, the 18-inch-thick apron is made of glass cloth laminated with a special polyester resin. Lockheed says the apron protects against flying metal

---

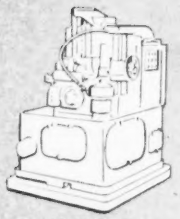
shipped, is 24 feet 4 inches long; 11 feet 10 inches wide; 5 feet high. It is the product of three open hearth furnace heats, tapped almost simultaneously. Total metal poured was approximately 300,000 pounds. Extra metal was to provide for heads which feed the cooling casting with molten metal, assuring a solid finished casting.

Thread-Form Rolling Data

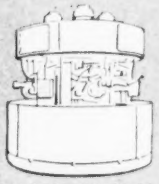
Copies of "Engineering Data on Thread and Form Rolling", designed to provide sources of technical information on the subject for design and process engineers, are available from Reed Rolled Thread Die Co., Worcester 1, Mass. Cost of the detailed 44-page booklet is $1.

Tells How to Cut Inventories

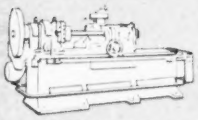
Folder of basic how-to-do-it information necessary to set up a minimum tool inventory program has been prepared by Carboloy Department of General Electric Co., Detroit. It's designed to show tool room supervisors and managers how they can reduce tungsten carbide tool inventories.



12-5 HOBBER

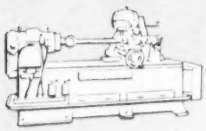


7-A ROTARY HOBBERS

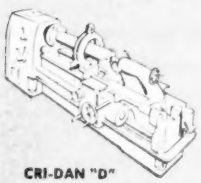


5H SPLINE HOBBER

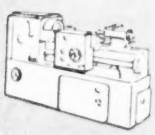
MODEL 40 THREAD MILLER



HT THREAD MILLER



CRI-DAN "D"



CRI-DAN "B"

FAST THREADING for FLYING HORSEPOWER!

QUICK FACTS ON THIS JOB

- RPM—200
- Cam—3"
- Passes—10
- Tool—Single Carbide
- Finish Obtained—15/30 micro inches
- Time—50 seconds

with the AMAZING CRI-DAN "D"

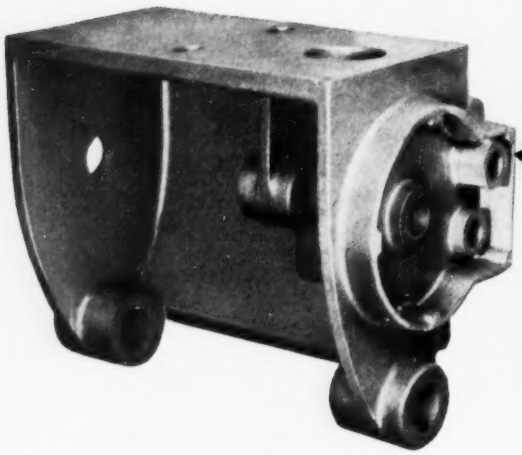
Speed-threading with unusual accuracy is nothing new for the Cri-Dan "D". But as the machine's reputation spreads, it is given tougher and tougher jobs to perform.

In this case it is threading an aircraft radial engine cylinder barrel with a 6-pitch, special buttress thread. Using a single point carbide tool and running at 200 RPM, the operation was completed in 10 passes requiring 50 seconds for the operation.

If you, too, have difficult threading jobs requiring speed as well as accuracy it will pay you to learn the facts about the Cri-Dan "D". For additional information get in touch with your Lees-Bradner representative—or write to us direct.

the LEES-BRADNER Company

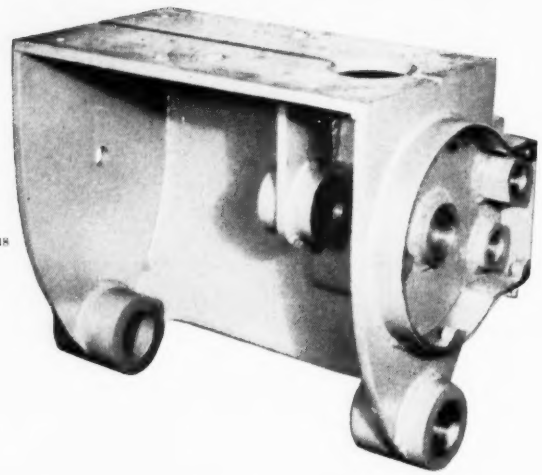
CLEVELAND 11, OHIO, U.S.A.



Gearbox for power-driven saw, as cast in Gray Iron.

45% SAVED...
on original cost of part

41% SAVED...
on machine and labor expense



Fabricated gearbox, which was replaced by the cast design.

By redesigning in Gray Iron, it is often possible to effect substantial cost savings. Here is a striking example:

> The manufacturer of a large power-driven metal saw found that the cost of a fabricated gearbox (right above) was out of line from a competitive standpoint. Designs for a suitable Gray Iron casting were requested and approved. Result:—the Gray Iron casting is effecting a saving of 45% on original cost of the part, plus a saving of 41% on machine and labor expense.

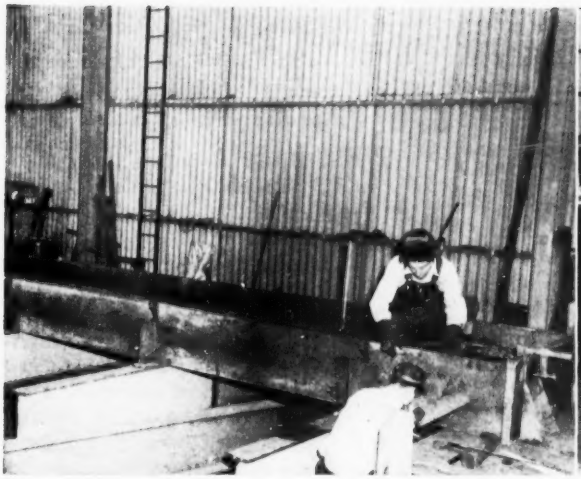
Doesn't this suggest that it's time to analyze *your* costs on certain fabricated parts—with a view to producing them better and more economically in Gray Iron? Write for technical information on the many advantages of the Gray Iron casting process.

GRAY IRON
Characteristics Include:

- Castability
- Rigidity
- Low Notch Sensitivity
- Wear Resistance
- Heat Resistance
- Corrosion Resistance
- Durability
- Vibration Absorption
- Machinability
- Wide Strength Range

Make it Better with Gray Iron • **Second largest industry in the Metal-working field**

GRAY IRON FOUNDERS' SOCIETY, INC.
NATIONAL CITY-E. 6th BLDG. CLEVELAND 14, OHIO



Special jigging layout was devised for holding web and flange elements for tack welding prior to final welding. Sledges and wedges tightened the assembly

Welding speed was about 25 inches per minute with adaption of radiograph-type burning machine to a manual welding head. Helper removes excess flux

Large Coliseum Welded in Shop

Fabricate structural members on improvised I-beam jigs; Manual welding head mounted on standard burning machine to make semi-automatic hidden arc welder

INGENIOUS use of semi-automatic hidden arc-welding outfits and shop jigs recently paid dividends in time and money savings in the fabrication of structural steel components weighing 67 tons each.

Ten rigid frame sections, including two columns, two rafters and crown, were constructed for the $3 million Allen County War Memorial Coliseum in Ft. Wayne, Ind. Coliseum's span is 224 feet with a center height of 88 feet.

Since most of the work was done in the shop of the Fort Wayne Structural Steel Co., only six splices required welding in erection. Other field connections were riveted, except for bolted purlins.

Cut Corners—Biggest cost saving in shop welding was realized by eliminating 6000 feet of V-edge preparation, 25 per cent of which would have been on curved or sweep edges of web plates at the juncture between columns and rafters. The $\frac{5}{8}$-inch web plates were welded to 2-inch flanges with 100 per cent fusing of parent metal.

Equivalent of a $\frac{3}{8}$-inch fillet was laid down at a speed of 25 inches per minute or better by a certified welder and helper using a manual Lincolnweld head mounted on a standard burning machine. Side rollers were extended so the electrode could be centered between them.

The streamlined welding speeds (about twice the rate possible with full manual methods) meant faster movement of structural tonnage through the fabricating shop and elimination of the need for more than a single jig for each identical section.

Handy Jigs — Steel was taken into the shop, burned or sawed to size and drawn up tightly on a special jigging layout. Essentially, jigs were a row of heavy I-beams resting on flanges.

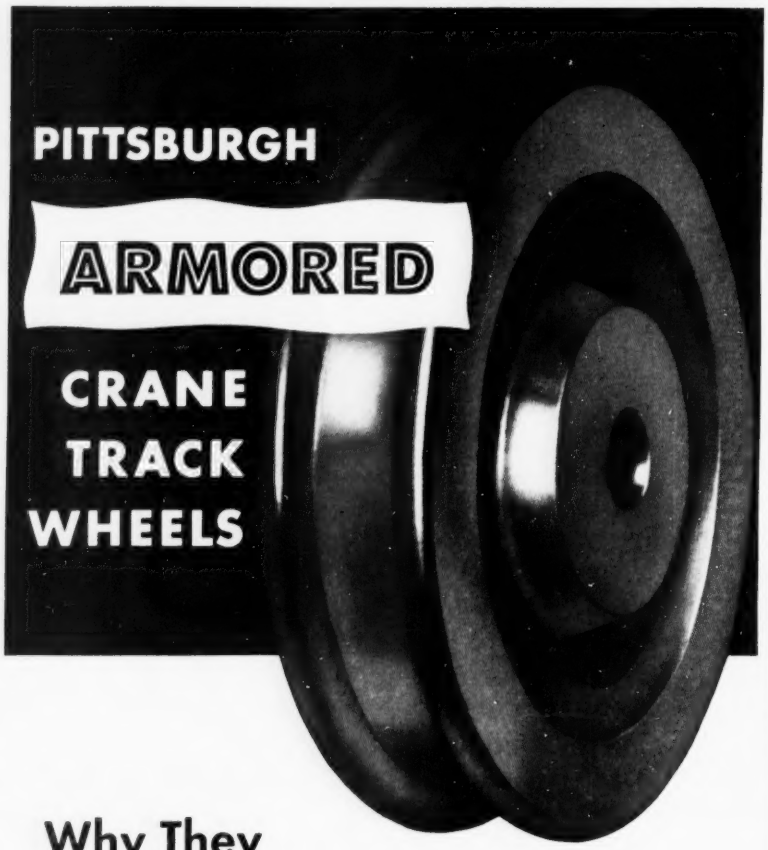
Brackets on I-beams held approximate dimensions of the part being fabricated. Flange and web-plate sections were fitted into the brackets, with web in flat position. The assembly was brought up tight with sledge hammers and wedging, then tack welded to hold it securely during final welding.

A simple cart, mounted on rubber tires, was devised to hold the coiled L-60 mild steel (5/64-inch) welding electrode. Actual welding was performed with the adapted burning machine operating at 425 amps, 650 volts.

One Pass—Welds were made in one pass, generally about 3 inches long and spaced every 13 inches. The welding operator supplied flux to the cone, and the flux was cleaned for re-use with the aid of a standard vacuum machine after deposited fillet was wire brushed.

Frames were constructed of flange plate $2\frac{1}{2}$ inches thick and web plate $\frac{5}{8}$ inch thick. Columns, rafters and crown sections were trucked to the building site after fabrication. Rafters and center sections were welded flat on a specially-constructed slab. This assembly was then hoisted over positioned columns and joints were splice welded.

Rigid frames reduced over-all steel requirements by 20 per cent and lowered building cubage by 680,000 cu ft over the truss system for equivalent usable interior space.



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• The secret of the long life of PITTSBURGH **Armored** Crane Wheels lies in something you can't see. It's part of the process perfected by PITTSBURGH which puts the right hardness in the right places. The treads and flanges are armored to the extra hardness of 601-712 B.H.N. 81-95 SC. But the cores? They are left tough and highly resistant to shock.

• This combination of hard treads and tough cores gives average service life up to five times that of untreated gears. It is your assurance of lower crane wheel costs. And PITTSBURGH gives you a written guarantee that you'll get this exceptional service.

• Available in sizes from 10" to 30" diameter. Treads: flat, tapered, radius, or "Pittsburgh Gear Company Standard." Bores and hubs may be finished by you or by us to your specifications.

Do This Today: Send us specifications of the wheels you use and we'll quote on PITTSBURGH Armored Crane Track Wheels ...guaranteed to give longer service.

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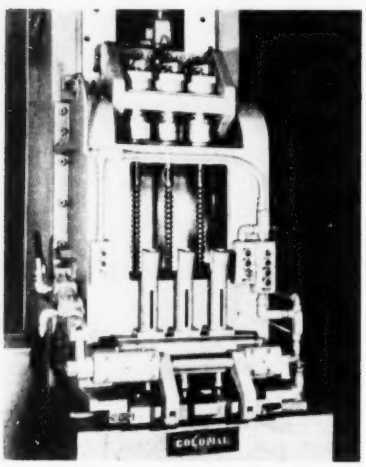
Broaching Big Bushings

It's fast with Colonial's new automatic positioning machine. Handles three at a time

BUSHINGS 8 inches long, automatically positioned in and out, are produced at the rate of 360 pieces per hour on a vertical pull-up broaching machine built by Colonial Broach Co., Detroit. Machine finishes three pieces with each broaching cycle. A high, continuous production rate is obtained by the addition of automatic ejection of parts and a semi-automatic magazine-type loader.

Parts are positioned automatically by means of a device which takes a set of three bushings from



BUSHINGS 8 INCHES LONG
. . . six every minute

the magazines and shuttles them into broaching position. As the broaches are pulled through the work, shuttle returns to the magazines for another set of bushings. Finished bushings are thus allowed to drop free at the end of the broaching stroke.

Hydraulic Operation—As they drop, they are deflected by a baffle and fall into a chute located at the right side of the machine. In the illustration the work guard has been removed to show the shuttle device and loading method. Operation is hydraulic with electrical controls and interlocks.

The three magazine loaders are semi-automatic, and the machine operator merely keeps them filled. Magazines are slotted to indicate when refilling is necessary.

Bushings broached are 8 inches

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Opened Door Clears Entire Doorway
Wind or Storm Can't Damage Doors — Open or Closed!

because they're

Kinnear Steel Rolling Doors

You can see some of the many advantages Kinnear Rolling Doors bring to all types of service opening in this warehouse installation.

Coiling compactly above the lintel, Kinnear Rolling Doors *never get in the way of the overhead conveyor.* And since they need no wall space for either storage or operation, posts, walls, windows or other doors can be placed flush with the door jambs on both sides of the opening.

These and other space-saving conveniences are in addition to the long-wearing ruggedness, fire resistance, and protection of Kinnear's interlocking steel-slat curtain. Their coiling action is also ideal for motorized, push-button control.

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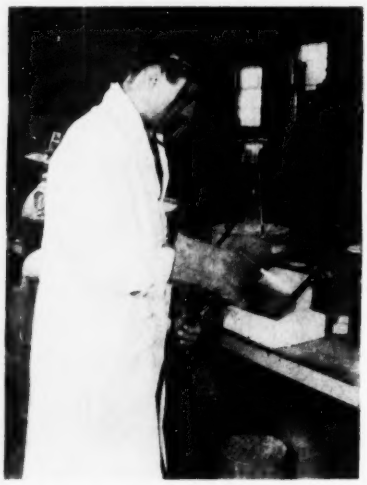
long with an inner diameter of 1.695 inches (finished) and an outer diameter of 2-1/16 inches. Stock removed is 0.055 inch.

Unified broaching set-up—the standard broaching machine, the round hole broaches, automation and shuttle type fixture—were all designed and produced by Colonial.

Ceramics For Atom Use

ONE OF THE most extensive laboratories of its type in the atomic energy program is the new ceramics department of Oak Ridge National Laboratory which Union Carbide & Carbon Corp. operates for the Atomic Energy Commission. In breadth and diversity of the investigations and studies undertaken in its research programs it is gaining stature as a center of ceramic research as applied to nuclear energy activities.



OAK RIDGE CERAMIC LAB
. . . what will handle "hot" stuff?

One outstanding problem in development of nuclear power is to find suitable material for constructing nuclear reactors or atomic furnaces, particularly since many service requirements are highly unusual. Reactors operating at temperatures over 800° F. may prove to be an economical system for nuclear power production.

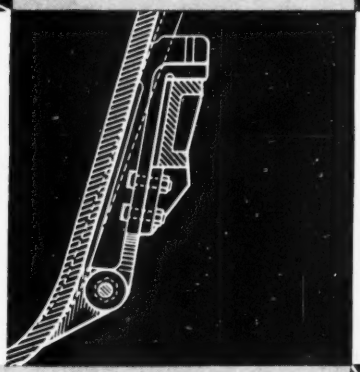
Limited Service — Most metals are limited to service below 1500° F. However, ceramic materials that can withstand elevated temperatures offer a possible solution to

Johnston Cinder Pots

have these features because you asked for them

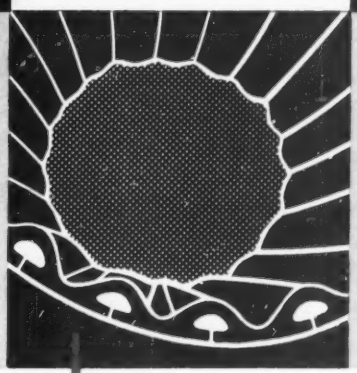
Radiating surface and cooling speed have been increased by CORRUGATIONS.

Cracking and inward creep are prevented by CURVED SIDE-WALLS.



Pot is suspended by BOTTOM SUPPORT BRACKETS to prevent strain on critical sections of the pot walls.

Distortion of the open diameter of the pot is resisted by EXPANSIBLE RIMS.



"Stickers" are prevented by optional BOTTOM COATING OF COPPER.

Johnston Patented Cinder Pots are adaptable to your particular plant requirements—from small units for use with electric furnaces to giant thimbles for blast furnace and open hearth operations.

Let us discuss your slag handling problems with you, and help you put Johnston Cinder Pots to work correcting them. For full information, wire, write, or call:

MACKINTOSH-HEMPHILL CO.

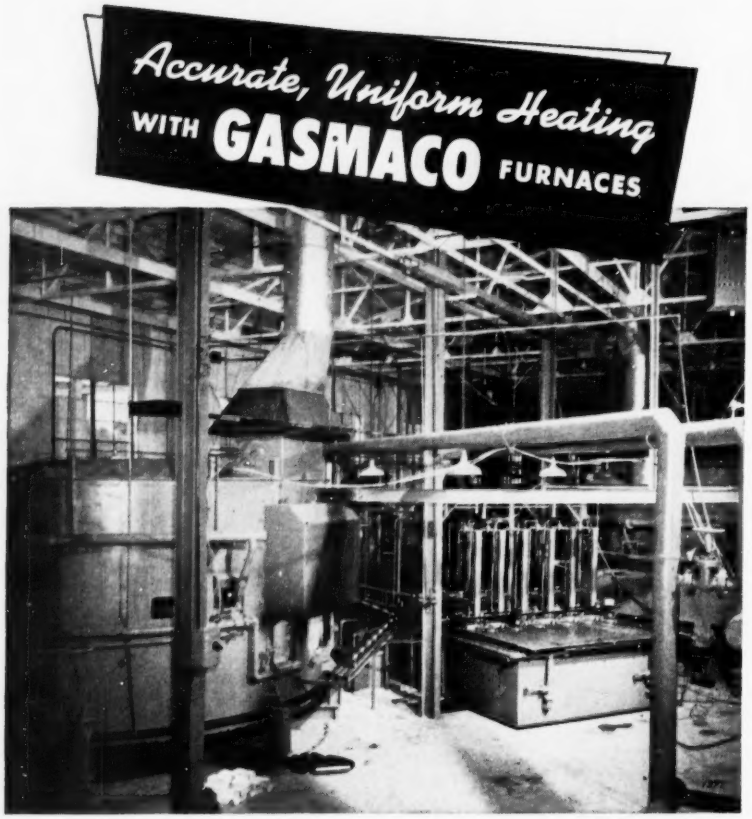
PITTSBURGH AND MIDLAND, PA.

Makers of the Rolls with the Striped Red Wabblers

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: rolls . . . steel and special alloy castings . . . completely integrated strip mills . . . heavy duty engine lathes . . . Mackintosh-Hemphill rotary straighteners . . . improved Johnston patented corrugated cinder pots and slag-handling equipment . . . shape straighteners . . . end-thrust bearings . . . shears . . . levellers

REDUCE YOUR SLAG HANDLING COSTS . . .
JOIN THE *TREND* TO JOHNSTON CORRUGATED POTS

Write for a copy of the new illustrated booklet, V-3108, "Johnston Corrugated Cinder Pots."



In the production of 105 mm shells, accuracy and uniformity of heating are of vital importance. To obtain necessary tolerance, without the use of valuable alloys, two Gasmaco furnaces are employed — one for hardening and the other for drawing. A quench tank is located between the furnaces on this operation, which requires the services of only two men

The shells are hardened, quenched and drawn in a vertical position to ensure positive uniformity and accuracy. The result is better quality, faster production and lower cost.

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the problem. In particular they show promise for use in low-cost power package reactors.

Cermets — combinations of ceramic materials and metals are possible white hopes of reactor materials research. Other important features include study of oxide, boride, and nitride ceramics as structural materials; techniques for the application of ceramic coatings to materials used in reactors; and evaluation of the effect of radiation damage on ceramic materials.

In addition to its program of fundamental and applied research projects that occupy about 85 per cent of the time of the ceramic department people, the group performs services for other research departments at Oak Ridge,

Members do consulting work, aid in design of specialized apparatus, and lend personal assistance wherever it is needed in investigations under way in the other Departments of the Laboratory and in the production of isotopes and fissionable material.

Cleaning Up Synthesis Gases

Coke ovens and gas generators, along with their smoke and soot, may be on their way out at the Du Pont plant in Belle, W. Va.

Company recently disclosed plans for building a production-scale unit to utilize a new, continuous, and soot-free process for producing synthesis gases, starting point for most operations at the plant.

Low-fusion-ash coal will be crushed and reduced to the fineness of talcum powder. Powdered coal will be blown into a ceramic-lined furnace. Here volatile matter and fixed carbon will be burned in the presence of steam and a deficiency of oxygen to give carbon monoxide and hydrogen.

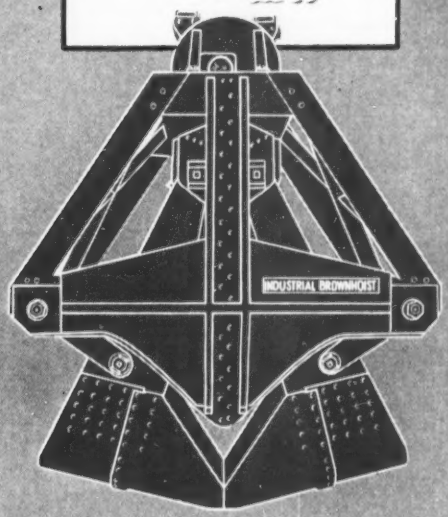
Carbon monoxide, with few exceptions, will be reacted with steam to give hydrogen and carbon dioxide. Hydrogen and nitrogen, the latter obtained in the production of oxygen from the air in separate equipment, will be used in making ammonia.

Bulk of the ash will be drawn off as slag. Light-weight particles will be caught in filtering equipment.

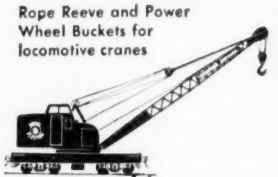
BROWNHOIST

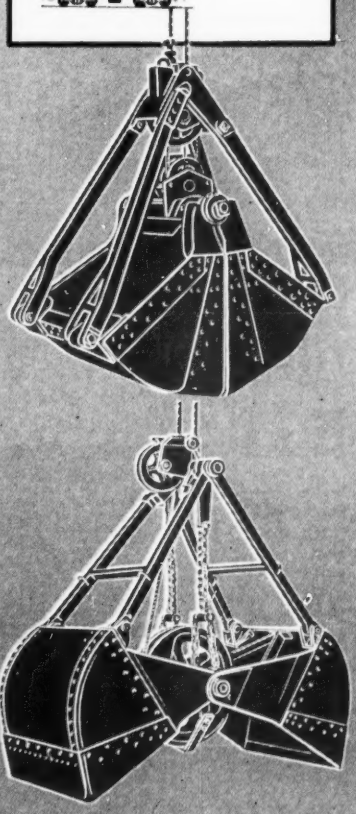
ALSO BUILDS BETTER BUCKETS

Link Type Buckets for boat unloaders, bridge cranes, fast plants



Rope Reeve and Power Wheel Buckets for locomotive cranes





Brownhoist Buckets are designed for specific jobs and especially engineered to meet the toughest materials handling requirements. They take deep, full capacity bites that move more materials per lift, thus making possible considerable savings in man-hours and production time. They are built for endurance and dependability, the same qualities that have accounted for Brownhoist leadership in the bulk materials handling field for more than three quarters of a century. Railroads, steel mills and dock operators who are loading and unloading coal, ore, slag or other bulk materials will find it pays to discuss their requirements with Brownhoist engineers.

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BROWNHOIST builds better cranes

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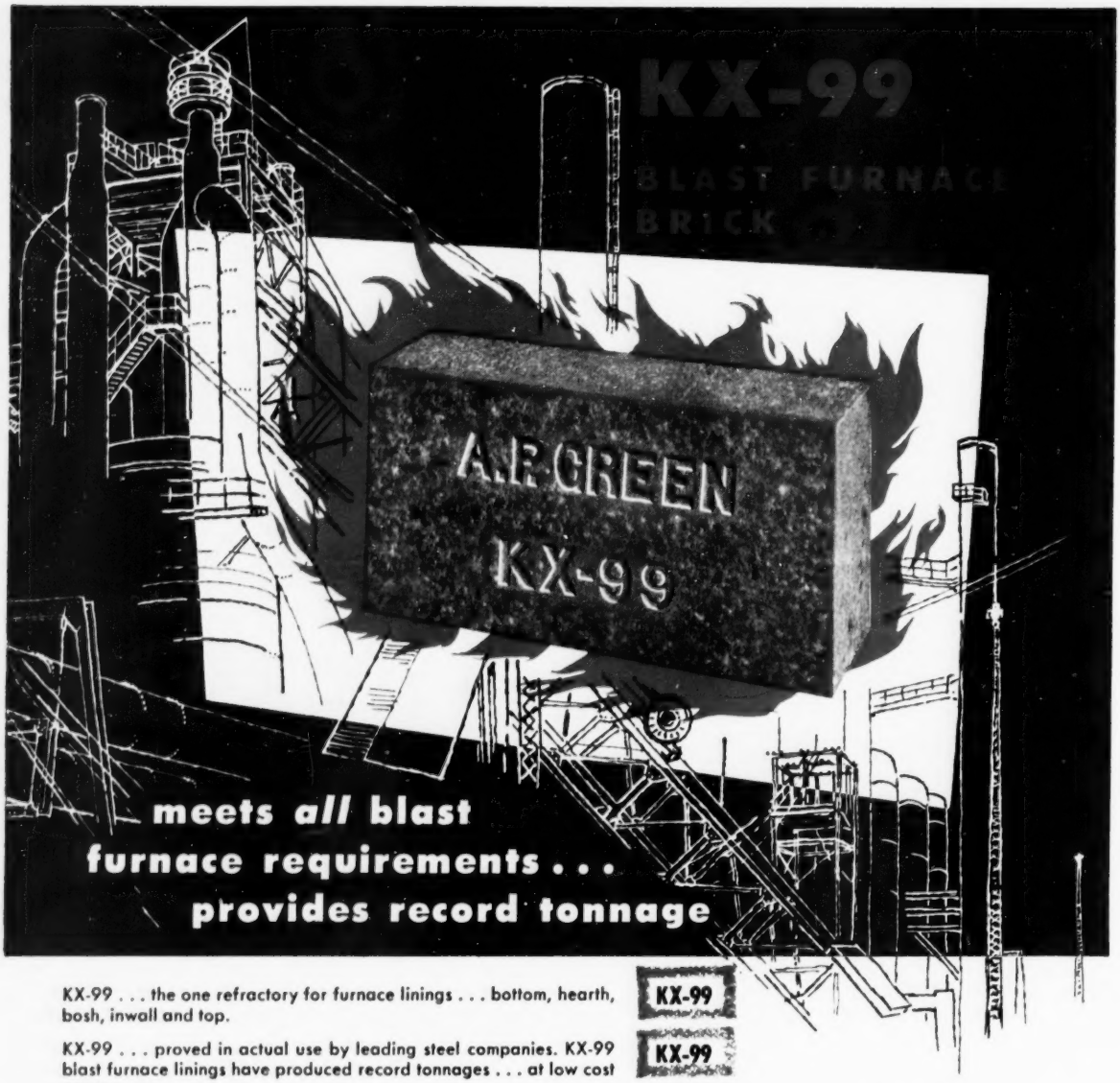

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KX-99 . . . a special high-fired brick that resists carbon monoxide disintegration. In actual service for an average of seven years in several furnaces, KX-99 showed no trace of carbon monoxide disintegration.

KX-99 . . . rugged, tough and dependable. Highly resistant to attack by basic slags, chemical action and abrasion.

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The A. P. Green Fire Brick Company Engineering Department will assist you with further information concerning the application of KX-99 Blast Furnace Brick . . . write

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STEEL
July 20, 1953

Market Outlook

SEASONAL influences—vacations and hot weather—have taken some of the zip out of current steel demand. But specifications for the major products continue active with overall requirements still outpacing supply. The steelmakers hold full order books for third quarter in most items. And fourth quarter business is coming in at such rate as to promise high-level steel operations through remainder of the year, barring, of course, an unexpected wave of order cancellations.

SUPPLY-DEMAND BALANCE—Whether supply will overtake demand in fourth quarter, as has been predicted, remains in the realm of speculation. Cross-currents of strength and weakness are present to lend to market uncertainty. Trade opinion, as a result, is somewhat mixed as to future prospects. It is significant, however, there is no certainty balance is likely before yearend in hot-rolled bars, hot and cold-rolled sheets, structurals and plates, which items account for the bulk of production.

SUMMER LULL REFLECTED—The current slight seasonal easing in market tension is not seen as indicative of any early marked change in conditions from those recently prevailing. Nothing more than the usual summer lull is thought reflected. Expectations are steel consumption will pick up steadily as the vacation season wanes, orders on steel mill books pointing to little, if any, relaxing in delivery pressure going into fourth quarter.

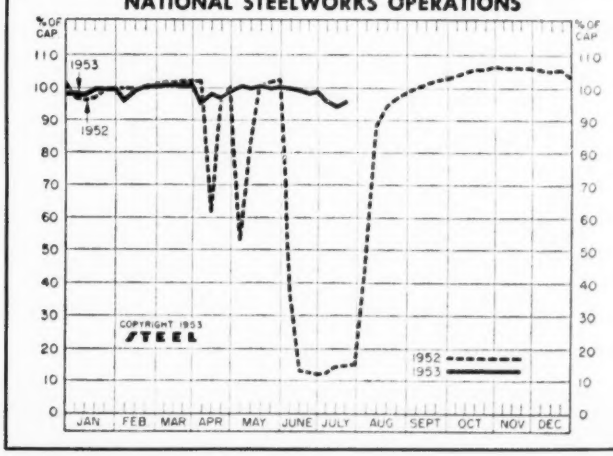
UNEASY OPTIMISM—While surface indications point to continued strong demand, warning signals of possible coming changes are not entirely lacking. Despite its placid appearance, the market actually is being described as in a period of uneasy optimism, with the trade awaiting specific developments, especially in the automotive industry, that will definitely show the direction demand is headed. Curtailments by independent auto builders when summer sales should be supporting high assemblies is cause for some uneasiness, being seen by some as the first sign of slackening automotive needs.

PRICES STABILIZED—The market has settled down pricewise after a month or so of adjustment in which time virtually all producers, with the exception of the premium-price mills, announced new and higher schedules. The fact the premium mills held their lists unchanged is seen as reflecting growing reluctance of buyers to pay any price for steel in the face of continued large production and improved prospects for easier procurement in fourth quarter. STEEL's finished steel price composite increased to $114.88, and a stronger market tone pushed the scrap composite up to $43.42.

RECORD BEING SET—The hectic pace of steel production in the first half of this year, if continued through the last six months, will result in the chalking up of a new all-time production record in 1953. Output of 57,960,457 net tons in the first six months was more than 5 million tons above the greatest previous half-year output of 52,895,863 tons registered in the last half of 1951.

PRODUCTION RISING—Steelmaking operations are recovering from the recent slump occasioned by curtailments accompanying the beginning of the mass vacation period. Last week the national ingot rate advanced 1.5 points to 96 per cent of capacity, equivalent to output of about 1,165,000 tons weekly.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(percentage of capacity engaged at leading production points)

	Week Ended July 18	Change	Same Week 1952	Same Week 1951
Pittsburgh	98	+ 2*	8	98
Chicago	99	+ 0.5	5	105
Mid-Atlantic	97.5	0	17	101
Youngstown	105	+ 12	6	103
Wheeling	98	+ 1	50.5	92
Cleveland	102	— 1.5*	0	98.5
Buffalo	106.5	0	0	104
Birmingham	101	0	0.5	100
New England	45	— 25	18	75
Cincinnati	98	— 2.5	33	103
St. Louis	95.5	+ 10.5	88	97
Detroit	108	+ 3	49	100.5
Western	100	5	33	102
Estimated National Rate	96	+ 1.5	15	102

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,254,459 net tons in 1953; 2,077,040 tons in 1952; 1,999,034 tons in 1951.

The Metalworking Outlook—p. 35 Technical Outlook—p. 83

Composite Market Averages

FINISHED STEEL PRICE INDEX: Bureau of Labor Statistics	July 14 1953	July 7 1953	Month Ago	June Average
(1947-1949=100)	141.6*	141.6*	136.3*	136.3*

AVERAGE PRICES (BUREAU OF LABOR STATISTICS)
Week Ended July 14, 1953

Units are 100 lb except where otherwise noted. For description see insert following p. 28, STEEL, Sept. 8, 1952. *Revised as of April, 1953, to reflect broader base.

Rails, standard No. 1	$4.400	Strip, C.R. carbon	$7.371
Rails, light, 40 lb	5.767	Strip, C.R. stainless, 430, (lb)	0.415
Plates, carbon	4.550	Strip, H.R. carbon	5.113
Structural Shapes	4.383	Pipe, black, buttweld (100 ft)	14.454
Bars, tool steel (lb)	1.730	Pipe, galv., buttweld (100 ft)	17.895
Bars, H.R. carbon	4.850	Tin Plate, hot-dipped, 1.25 lb	8.433
Bars, reinforcing	4.788	Tin Plate, electrolytic, 0.25 lb	7.133
Bars, C.F. carbon	7.860	Black Plate, can making quality	6.233
Bars, C.F. alloy	11.075	Wire, carbon, 8 gage	7.713
Sheets, H.R. carbon	4.765	Wire, stainless, 430 (lb)	0.545
Sheets, C.R. carbon	5.904	Bale Ties, (bundle)	5.630
Sheets, galvanized	7.015	Nails, wire, 8d common	7.530
Sheets, C.R. stainless, 302 (lb)	0.548	Wire, barbed (80 rod spool)	6.793
Sheets, electrical grade	9.017	Woven Wire Fence (20 rod roll)	16.047

FINISHED PRICE INDEX, Weighted: Calculated by STEEL*	July 16 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.33	189.18	187.38	171.92	143.08
Index in cents per lb.	5.129	5.125	5.076	4.657	3.876

ARITHMETICAL PRICE COMPOSITES: Calculated by STEEL*					
Finished Steel NT	$114.88	$114.53	$111.93	$106.32	$80.27
No. 2 Fdry. Pig Iron, GT	56.54	56.54	55.04	52.54	41.21
Basic Pig Iron, GT	56.04	56.04	54.66	52.16	40.74
Malleable Pig Iron, GT	57.27	57.27	55.77	53.27	41.83
Steelmaking Scrap, GT	43.42	43.17	39.83	42.50	40.83

* For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS	July 16 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.70	2.875
Bars, H.R., Chicago	4.15	4.15	4.15	3.70	2.875
Bars, H.R., del. Philadelphia	5.302	5.302	5.302	4.252	3.365
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.55	3.50
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.65	2.775
Shapes, Std., Chicago	4.10	4.10	4.10	3.65	2.775
Shapes, del., Philadelphia	4.38	4.38	4.38	3.93	2.98
Plates, Pittsburgh	4.10	4.10	4.10	3.70	2.925
Plates, Chicago	4.10	4.10	4.10	3.70	2.925
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.15	3.45
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.70	2.95
Plates, Claymont, Del.	4.55	4.55	4.35	4.15	3.65
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.60-75	2.775
Sheets, H.R., Chicago	3.925	3.925	3.925	3.60	2.775
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.35	3.50
Sheets, C.R., Chicago	4.775	4.775	4.775	4.35	3.50
Sheets, C.R., Detroit	4.975	4.975	4.775	4.55	3.71
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	4.80	3.90
Strip, H.R., Pitts.	3.975-4.425	3.975-4.425	3.975-4.225	3.75-4.00	3.05
Strip, H.R., Chicago	3.925	3.925	3.925	3.50	2.775
Strip, C.R., Pittsburgh	5.45-5.95	5.45-5.95	5.10-5.80	4.65-5.35	3.775
Strip, C.R., Chicago	5.70	5.70	5.70	4.90	3.60
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.30-6.05	4.85-5.60	3.71
Wire, Basic, Pitts.	5.475-5.525	5.475-5.525	5.475-5.525	4.85-5.10	3.725
Nails, Wire, Pittsburgh	6.35-6.55	6.35-6.55	6.55	5.90-6.20	5.125
Tin plate(1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.70	$6.60
SEMIFINISHED					
Billets, forging, Pitts.(NT)	$75.50	$75.50	$70.50	$66.00	$54.00
Wire rods, ½-⅝", Pitts.	4.525	4.525	4.425	4.10-30	3.175
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$55.50	$53.00	$43.00
Basic, Valley	56.00	56.00	54.50	52.00	39.00
Basic, del. Phila.	60.75	60.75	59.25	56.75	42.17
No. 2 Fdry, Pitts.	56.50	56.50	55.00	52.50	42.50
No. 2 Fdry, Chicago	56.50	56.50	55.00	52.00	41.00
No. 2 Fdry, Valley	56.50	56.50	55.00	52.50	39.50
No. 2 Fdry, del. Phila.	61.25	61.25	59.75	57.25	42.67
No. 2 Fdry, Birm.	52.88	52.88	51.38	48.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	58.95	56.43	45.09
Malleable, Valley	56.50	56.50	55.00	52.50	39.50
Malleable, Chicago	56.50	56.50	55.00	52.50	41.50
Ferromanganese, Etna, Pa.	200.00†	200.00†	200.00†	188.00*	150.50*
SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$44.50	$44.50	$40.50	$44.00	$40.25
No. 1 Heavy Melt, E. Pa.	44.25	43.50	41.50	41.00	43.00
No. 1 Heavy Melt, Chicago	41.50	41.50	37.50	42.50	39.25
No. 1 Heavy Melt, Valley	45.50	45.50	42.50	44.00	40.25
No. 1 Heavy Melt, Cleve.	44.50	44.50	40.50	43.00	39.75
No. 1 Heavy Melt, Buffalo	44.75	40.75	40.75	37.00	44.00
Rails, Rerolling, Chicago	54.50	54.00	47.50	52.50	60.00
No. 1 Cast, Chicago	41.00	41.00	39.00	45.00	68.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.00
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.50	15.50
Oven Fdry, Chicago	24.50	24.50	24.50	23.00	19.50

*78-82% Mn, per gross ton. †74-76% Mn, per net ton.

PIG IRON

F.o.b. furnace prices as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies on page 165.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$58.00	$58.50	$59.00	$59.50
New York, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Philadelphia, del.	60.75	61.25	61.75	62.25
Birmingham District				
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham S9	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	....	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2	56.00	56.50	57.00	....
Buffalo H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14	56.00	56.50	56.50	....
So.Chicago,Ill. Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.61	59.11	59.11	59.61
Lorain,O. N3	56.00	....	....	57.00
Duluth I-3	....	....	56.50	....
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass E1	....	63.25	63.75	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
Lone Star,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	*58.00*	*59.00*	*59.00*	....
Rockwood,Tenn. T3	....	....	58.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	....
Pitts.,N.&S. sides, Ambridge, Aliquippa, del.	57.37	57.87	57.87	....
McKeesRocks, del.	57.04	57.54	57.54	....
Laurenceville, Homestead, Wilmerding, Monaca, del.	57.66	58.16	58.16	....
Verona, Trafford, del.	58.19	58.69	58.69	....
Brackenridge, del.	58.45	58.95	58.95	....
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	60.00	60.50	61.00	61.50
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.47	61.97	....	....
Troy,Nn.Y. R2	58.00	58.50	59.00	....
Youngstown District				
Hubbard,O Y1	56.00	56.50	56.50	....
Youngstown Y1	56.00	56.50	56.50	....
Youngstown U5	56.00	....	....	57.00
Mansifeld,O., del.	60.65	61.15	61.15	61.65

*Low phos, southern grade

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	95.50
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frt. allowed K2	98.50
Wenatchee,Wash., OH & Fdry, freight allowed K2	95.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, Intermediate, A7	$61.00
Rockwood,Tenn. T3	68.50
Steelton,Pa. B2	64.00
Philadelphia, delivered	67.55
Troy,N.Y. R2	64.00

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NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 29.75-30.00c, Conn. Valley; Lake 30.125c; foreign electrolytic, deld., 29-75-30.00c.

Brass ingots: 85-5-5-5 (No. 115) 26.00c; 88-10-2 (No. 215) 34.75c; 80-10-10 (No. 305) 30.00c; No. 1 yellow (No. 405) 21.25c.

Zinc: Prime western 11.00c; brass special 11.25c; intermediate 11.50c; East St. Louis; high grade 12.35c; special high grade 12.50c deld.

Lead: Common 13.30c; chemical 13.40c; corroding 13.40c; St. Louis.

Primary Aluminum: 99% plus, ingots 20.50-21.50c; pigs 19.50-20.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 22.75-23.50c; No. 12 foundry alloy (No. 2 grade) 22.00-23.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75-24.00c, grade 2, 23.00-23.25c; grade 3, 22.00-22.25c; grade 4, 21.00-21.00c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 27.00c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt RFC, 121.50c; outside market $80.50.

Antimony: American 99-99.8% and over but not meeting specifications below 34.50c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 35.00c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 60.00c; 25-lb pigs 62.65c; "XX" nickel shot, 63.65c; "F" nickel shot or ingots, for addition to cast iron, 60.00c. Prices include import duty.

Mercury: Open market, spot, New York, $185-$194, per 76-lb flask.

Cadmium: "Regular" straight or flat forms, $2 deld.; special or patented shapes $2.15.

Beryllium-Copper: 3.75-4.25% Be, $40.00 per lb of contained beryllium, with balance as copper at market price on date of shipment, f.o.b. Reading, Pa. or Elmore, O.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open-market, New York 86.25c per oz.

Platinum: $93 per ounce from refineries.

Palladium: $23-$24 per troy ounce.

Iridium: $165-$175 per troy ounce.

Titanium: (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Cents per pound, f.o.b. mill, effective Apr. 1, 1953. Listings are lowest quotations.)

Sheet: Copper 50.48; yellow brass 42.87; commercial bronze, 95% 49.89; 90% 48.76; red brass, 85% 47.11; 80% 45.99; best quality, 44.43; nickel silver, 18%, 59.84; phosphor-bronze grade A, 5%, 70.50.

Rod: Copper, hot-rolled 46.83; cold-drawn 48.08; yellow brass free cutting, 36.68; commercial bronze 95% 49.58; 90% 48.45; red brass 85%, 46.80; 80%, 45.68.

Seamless Tubing: Copper 50.42; yellow brass 45.78; commercial bronze, 90%, 51.32; red brass, 85%, 49.93.

Wire: Yellow brass 43.16; commercial bronze, 95%, 50.18; 90%, 49.05; red brass, 85%, 47.40; 80%, 46.28; best quality brass, 44.72.

(Base prices effective July 8, 1953)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l., 37.03. Magnet wire del., 15,000 lb or more 41.83; l.c.l., 42.58.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders. Effective Jan. 22, 1953.)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	32.9	...	...
0.135-0.096	12-48	33.4	...	...
0.095-0.077	12-48	34.1	31.8	36.3
0.076-0.061	12-48	34.7	32.0	36.5
0.060-0.048	12-48	35.0	32.2	36.8
0.047-0.038	12-48	35.5	32.6	37.1
0.037-0.030	12-48	35.9	33.0	37.8
0.029-0.024	12-48	36.5	33.3	38.3
0.023-0.019	12-36	37.1	34.0	39.0
0.018-0.017	12-36	37.9	34.6	39.9
0.016-0.015	12-36	38.8	35.4	41.1
0.014	12-24	39.8	36.4	42.4
0.013-0.012	12-24	40.9	37.1	43.4
0.011	12-24	41.9	38.3	45.0
0.010-0.0095	12-24	43.1	39.4	46.6
0.009-0.0085	12-24	44.3	40.7	48.5
0.008-0.0075	12-24	45.8	41.9	50.3
0.007	12-18	47.3	43.4	52.6
0.006	12-18	48.9	44.8	57.0

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	Round T3	Round T4	Hexagonal T3	Hexagonal T4
Drawn				
0.125	58.4	56.8	...	...
0.156-0.172	49.7	48.0	...	...
0.188	49.7	48.0	...	61.2
0.219-0.234	47.0	45.3	...	...
0.250-0.281	47.0	45.3	...	58.4
0.313	47.0	45.3	...	55.7
Cold-finished				
0.375-0.531	45.3	43.7	55.1	52.4
0.563-0.688	45.3	43.7	52.4	49.2
0.750-1.000	44.2	42.6	48.0	46.4
1.063	44.2	42.6	...	44.8
1.125-1.500	42.6	41.0	46.4	44.8
Rolled				
1.563	42.0	40.5	...	...
1.625-2.000	41.5	39.8	...	43.3
2.125-2.500	40.5	38.8	...	...
2.750-3.375	39.3	37.6	...	...

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) **Sheets:** Full rolls, 140 sq ft or more $15.50 per cwt; add 50c cwt 100 sq ft to 140 sq ft. **Pipe:** Full coils $18.50 per cwt. **Traps and bends:** List prices plus 30%.

ZINC

Sheets 23.00c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 20.75-21.75c; over 12-in. 20.75-21.75c.

"A" NICKEL

(Base prices f.o.b. mill effective Mar. 9, 1953) **Sheets,** cold-rolled 86.50c. **Strip,** cold-rolled 92.50c. **Rods and shapes,** 82.50c. **Plates,** 84.50c. **Seamless tubes** 115.50c.

MONEL

(Base prices f.o.b. mill effective July 1, 1953) **Sheets,** cold-rolled 67.50c. **Strip,** cold-rolled 70.50c. **Rods and shapes,** 65.50c. **Plates** 66.50c. **Seamless tubes,** 100.50c. **Shot and blocks,** 60.00c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb 58.00c-65.00c; 25 to 99 lb, 48.00c-55.00c; 100 lb to 5000 lb, 44.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) **Sheets,** $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 42.18c; oval 41.68c.

Nickel Anodes: Rolled, oval, carbonized, carloads 81.00c; 5000 to 29,999 lb, 83.00c; 500 to 4999 lb, 85.00c; 1 to 499 lb, 89.00c, f.o.b. Cleveland.

Nickel Chloride: In 100 lb bags; 10,000 lb and over, 37.00c; 5000 to 9900 lb, 38.00c; 400 to 4900 lb, 40.00c; 300 lb, 42.00c; 200 lb, 43.00c; 100 lb, 45.00c, f.o.b. Cleveland.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 71c per lb; 100 to 350 lb drums only, 100 to 600 lb 56.7c; 700 to 1900 lb, 54.3c 2000 to 9900 lb 52.5c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers. Based on 93-cent tin.

Tin Anodes: Bar, 1000 lb and over, $1.09; 500 to 999 lb, $1.095; 200 to 499 lb $1.10; less than 200 lb, $1.115. Freight allowed east of Mississippi and north of Ohio and Potomac. Based on 93-cent tin.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 94.9c; more than 2000 lb, 92.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers. Based on 93-cent tin.

Stannous Chloride (Anhydrous): In 400 lb bbl, $1.055; 100 lb kegs $1.08, f.o.b. Carteret, N.J., freight allowed on 100 lb or more. Based on 93-cent tin.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 53.30c, f.o.b. Niagara Falls, N. Y.

Scrap Metals

Brass Mill Allowances

(Prices in cents per pound for less than 20,000 pounds, f.o.b. shipping point; on lots over 20,000 pounds at one time of any or all kinds of scrap, add 1 cent per pound.)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	28.625	28.625	27.875
Yellow Brass	21.375	21.125	19.625
Commercial Bronze			
95%	27.250	27.000	26.500
90%	26.125	25.875	25.375
Red Brass			
85%	25.125	24.875	24.375
80%	24.125	23.875	23.375
Best Quality(71-80%)	22.500	22.250	21.750
Munts metal	20.000	19.750	19.250
Nickel silver, 10%	25.250	25.000	12.625
Phos. Bronze, A	30.625	30.375	29.875
Naval Brass	20.000	19.750	19.250
Manganese Bronze	20.000	19.750	19.250

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 23.50-24.00; No. 2 copper 22.00; light copper 20.50; refinery brass (60% copper) per dry copper content 19.50-20.00.

INGOT MAKERS' COPPER AND BRASS SCRAP BUYING PRICES

(Cents per pound, carlots, delivered)

No. 1 copper 24.00; No. 2 copper, 22.50; light copper 21.00; No. 1 composition borings 18.00-18.25; No. 1 composition solids, 18.50-18.75; radiators 14.00; heavy yellow brass solids, 14.50; yellow brass turnings 13.50.

SMELTERS' BUYING PRICES FOR SCRAP ALUMINUM

(Carlots, delivered)

28 aluminum clippings, 16.00-17.50c; mixed clippings, 14.50-16.00c; old aluminum sheet, 14.00-14.50c; old aluminum cast, 14.00-14.00c; borings and turnings, 14.00-14.50c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 23.00; No. 2 copper 20.00; light copper 18.00; No. 1 composition red brass 17.00; No. 1 composition turnings 16.50; mixed brass turnings 10.00; new brass clippings 17.50; No. 1 brass rod turnings 16.00; light brass 10.00; heavy yellow brass 12.50; new brass rod ends 16.50; auto radiators, unsweated 13.00; cocks and faucets 15.00; brass pipe 16.00.

Aluminum: Clippings 28 14.00; old sheets 10.00; crankcase 10.00; borings and turnings 7.50; pistons and struts 7.50.

Tin: No. 1 pewter 55.00; block tin pipe 80.00; No. 1 babbitt 45.00.

Lead: Heavy 10.50-11.00; battery plate 6.00-6.25; linotype and stereotype 12.75; electrotype 11.00; mixed babbitt 12.00-12.50.

Zinc: Old zinc, 4.50; new die cast scrap, 4.50; old die cast scrap, 3.50.

Nickel: Sheets and clips $1.00; rolled anodes $1.00; turnings 85.00c; rod ends $1.60.

Monel: Clippings 33.00; old sheet 30.00; turnings 25.00; rods 33.00.

DAILY PRICE RECORD

1953	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
July 15-16	29.75-30.00	13.30	11.00	80.50	21.00	34.50	60.00	85.25
July 14	29.75-30.00	13.30	11.00	81.00	20.50	34.50	60.00	85.25
July 13	29.75-30.00	13.30	11.00	82.00	20.50	34.50	60.00	85.25
July 8-11	29.75-30.00	13.30	11.00	83.00	20.50	34.50	60.00	85.25
July 7	29.75-30.00	13.30	11.00	82.75	20.50	34.50	60.00	85.25
July 6	29.75-30.00	13.30	11.00	84.75	20.50	34.50	60.00	85.25
July 3	29.75-30.00	13.30	11.00	87.00	20.50	34.50	60.00	85.25
July 2	29.75-30.00	13.30	11.00	88.00	20.50	34.50	60.00	85.25
July 1	29.75-30.00	13.30	11.00	89.50	20.50	34.50	60.00	85.25
June 29-30	29.75-30.00	13.30	11.00	90.50	20.50	34.50	60.00	85.25
June 26-27	29.75-30.00	13.30	11.00	91.25	20.50	34.50	60.00	85.25
June 25	29.75-30.00	13.30	11.00	91.75	20.50	34.50	60.00	85.25
June 24	29.75-30.00	13.30	11.00	93.00	20.50	34.50	60.00	85.25
June 23	29.75-30.00	13.30	11.00	93.875	20.50	34.50	60.00	85.25
June 22	29.75-30.00	13.30	11.00	93.50	20.50	34.50	60.00	85.25
June 19-20	29.75-30.00	13.30	11.00	92.75	20.50	34.50	60.00	85.25
June Avg.	29.875	13.213	11.00	92.918	20.50	34.50	60.00	85.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9% base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Nonferrous Metals

Alcoa raises aluminum prices following contract settlements with workers. Other producers may follow in first increase since lifting of government controls

ALUMINUM PRICES are breaking through the industry's self-imposed ceiling in the first increase since government controls were lifted.

Aluminum Co. of America made the first move, adding a half-cent to standard 99 per cent pig and a full cent to 99 per cent plus ingot. Effective July 15, base price of ingot metal is 21.50 cents and pigs 20.00 cents. Other grades of ingot were advanced a half-cent or more depending on form and composition. Mill product revisions will follow as schedules are set up. Price differential between pig and ingot was widened to 1.5 cents from the usual one cent spread.

Where and When—The new prices followed swiftly on the heels of contract settlement between Alcoa and its unions. Both Kaiser Aluminum & Chemical Corp. and Reynolds Metals Co. are now dickering with their workers. They will undoubtedly be forced to post higher prices if their labor increases approximate Alcoa's.

Canadian aluminum sold here will follow suit when a uniform U. S. price is established. Until a one-price level jells, price will remain at 20.50 for ingot and 19.50 for pig, current Reynolds and Kaiser quotations.

Behind the Bush—Significant to watch in the coming price shuffle will be those on mill products and the reroll and redraw materials. Kaiser recently boosted prices on reroll sheet 2 cents a pound and reroll foil stock one cent a pound but the other producers didn't, leaving the company as one industry man puts it, "All alone out in left field."

One thing certain about product increases this time . . . they won't be across-the-board percentage additions such as were given by OPS (one of 5 per cent and another of 4 per cent, last of which came Jan. 23, 1953). In the new price lists, each product will carry its own weight, depending on such factors as cost of production, supply and demand and market development considerations which can't be accounted for under blanket-type increases.

Differentials Ended—Alcoa's settlement with the USW-CIO and AFL calls for a general wage increase totaling 8.5 cents an hour, just what the steelworkers got. Removal of north-south wage differentials formed another part of the agreement, with seven southern plants winning an additional 2 cents an hour. This provision will put extra pressure on Reynolds negotiations, as it has a greater proportion of its plants in the south than the other two producers.

Alcoa's agreements will add about $7 million to the company's annual overhead. A very rough estimate of additional revenue stemming from the primary price increase and based on Alcoa production, would be somewhat over $6 million. The company still has to face negotiations with 7000 workers represented by three unions, but precedent has been established.

The AFL settlement increased the escalation increase each July from 4 to 5 cents. The contracts did not refer to a guaranteed annual wage, said to be a CIO goal, nor to a union shop clause. Alcoa contracts have only a maintenance of membership clause, while other producers have already granted union shops.

Facing Facts in Costs

Repricing copper wire on the basis of actual copper costs is the first step toward realism in the red metal. Anaconda Wire & Cable and Kennecott Wire & Cable joined Phelps Dodge Copper Products, General Cable and Rome Cable in the new level, based on 30-cent copper. Brass mill products will follow when competition stiffens. Chile too must reach a price decision soon, and snowballing of these factors could easily break the 30-cent domestic price.

Brass and wire mills are now back from vacations and operating against good backlogs extending into the third quarter. Copper sales are perking up accordingly, though everyone's keeping a hawk-eye on inventory. Buyers will get a good idea of what's ahead when private trading begins in London, Aug. 5. Supply is no problem nor is it likely to be. The U. S. stockpile may absorb some of the British government's metal but no concrete plans have been formulated yet.

Zinc Shipments Dip, Stocks Edge Up
as production and unfilled orders hold steady
(thousands of tons)

1953	Production	Shipments	Stocks*	Backlog*
Jan.	82.0	80.7	88.5	39.7
Feb.	76.9	71.7	93.7	37.2
Mar.	83.5	77.3	99.9	54.5
Apr.	80.5	86.0	94.3	38.7
May	82.4	84.3	92.5	43.3
June	81.6	76.8	97.3	44.3

* At end of the month
Source: American Zinc Institute

End of Zinc Basing Point?

American Smelting & Refining Co. dropped the East St. Louis zinc basing point system last week, a move that may end it for all the industry.

The firm upped its price for prime western from 11 cents to 11.25 cents per pound. That quotation will apply to all deliveries made from the Atlantic coast to the Continental Divide. West of the Continental Divide, the price will be 11.50 cents a pound. Actually the move means a price cut for many consuming areas, particularly in Pittsburgh and on the West and East coasts, because buyers won't have to pay freight from East St. Louis. In New York, for example, the old delivered cost was 11.83 cents per pound on domestic metal.

American Smelting also is increasing its price for other grades of zinc which have been and will continue to be the basis of delivery to consumers. The price for regular high grade will be 12.60 cents a pound east of the Continental Divide and 12.85 cents west of the divide. Special high grade will be 12.75 cents a pound delivered east of the divide and 13 cents west of the divide.

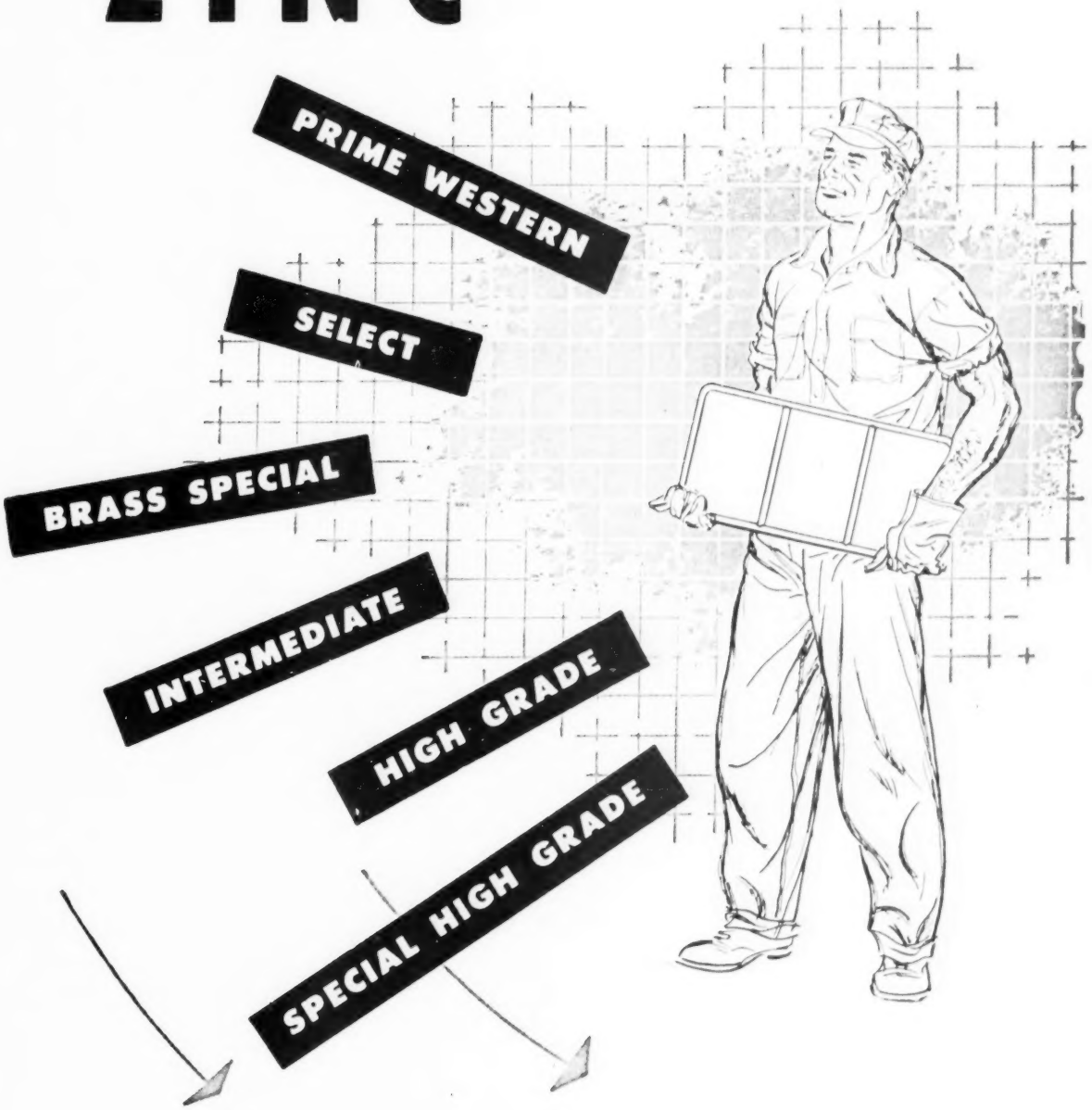
Lead Steady, Tin Dropping

Nation's lead markets are lazy as the July weather. Several major lead consuming plants are scheduled to resume operations this week. A noticeable stirring among European lead users, operating off starvation supplies for months, gives hope of a revival abroad to match strong U. S. usage this year. Lead price is firm at 13.30 cents, St. Louis.

Tin presents a different story. It's threatening to sink below 80 cents, close in on the pre-Korea price. Market men expect it to put up a strong fight at the 80-cent mark, just as it did to keep from slipping below 90 cents. World production of tin dipped from 16,200 tons in March to 14,500 tons in April, reports the International Tin Study Group.

SLAB ZINC

every grade of ZINC
for urgent military and
civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Charges shown in italics.
Code numbers following mill points indicate producing company; key on page 157. Key to footnotes, page 159.

—SEMIFINISHED—

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS Alloy (NT)
Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.50
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....81.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 .....62.00
Lackawanna,N.Y. B2 ..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 ....75.50
Buffalo R2 .....75.50
Canton,O. R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3 ..82.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 ....75.50
Fontana,Calif. K1 ....94.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston S5 .....85.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2 ..75.50
LosAngeles B3 .....94.50
Munhall,Pa. U5 .....75.50
Seattle B3 .....94.50
So.Chicago R2,U5,W14 75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ..94.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2 .....82.00
Canton,O. T7 .....84.60
Conshohocken,Pa. A3 ..89.00
Detroit R7 .....85.00
Fontana,Calif. K1 ..101.00
Gary,Ind. U5 .....82.00
Houston S5 .....92.00
Ind.Harbor,Ind. Y1 ..82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14 82.00
So.Duquesne,Pa. U5 ...82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$87.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ..113.50
Gary,Ind. U5 .....92.50
Massillon,O. R3 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ....$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ...3.75

WIRE RODS
Alton,Ill. L1 .....4.70
AlabamaCity,Ala. R2. 4.525
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 ....4.525
Fontana,Calif. K1 ....5.325
Johnstown,Pa. B2 ....4.525
Houston S5 .....4.925
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ..4.865
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ..4.775
Monessen,Pa. P7 ....4.725
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ..5.175
Portsmouth,O. P12 ...4.725
Roebling,N.J. R5 ....4.425
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2 4.625
Sterling,Ill.(1) N15 ..4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ...4.825

—STRUCTURALS—

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Bethlehem,Pa. B2 ....4.15
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....4.60
Ind.Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.80
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.80
Minnequa,Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif.(22) P1 ....4.91
Phoenixville,Pa. P4 ...4.95
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14 4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.35

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.30
Lackawanna,N.Y. B2 ...4.15
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 .....5.00

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 .....6.175
Bethlehem,Pa. B2 .....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 .....6.175
Ind.Harbor,Ind. I-2 ...6.175
Ind.Harbor,Ind. Y1 ...6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill. U5, W14 6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

BEARING PILES
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 .....4.10

—PILING—

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...4.925
Lackawanna,N.Y. B2 ...4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

—PLATES—

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky. (15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 ....4.55
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 ....4.35
Conshohocken,Pa. A3 ..4.55
Ecorse,Mich. G5 .....4.65
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1..4.75
Gary,Ind. U5 .....4.10
GraniteCity,Ill. G4 ....4.60
Geneva,Utah C11 .....4.10
Harrisburg,Pa. C5 .....6.50
Houston S5 .....4.60
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ..4.10
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14 4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ...4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.40
Youngstown R2, U5, Y1.4.10

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland R2 .....5.95
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.50
Ecorse,Mich. G5 .....7.10
Fairfield,Ala. T2 .....6.25
Fontana,Calif.(30) K1..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ...6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 ....6.25
Lackawanna,N.Y. B2 ..6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14 6.25
SparrowsPoint,Md. B2..6.25
Warren,O. R2 .....5.95
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.65
Coatesville,Pa. L7 ....5.75
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5, W14 5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohocken,Pa. A3 ..5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 .....5.15

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ..4.35
Ashland,l.c.l. (15) A10..4.85
Cleveland,c.l. 4.70
Warren,O. c.l. R2 ....4.70

—BARS—

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..4.15
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.45
Bessemer,Ala. T2 .....4.15
Buffalo R2 .....4.15
Clairton,Pa. U5 .....4.15
Cleveland R2 .....4.15
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.50
Emeryville,Calif. J7 ...4.90
Fairfield,Ala. T2 .....4.15
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.65
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.85
Massillon,O. R2, R8 ...5.20
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.70
NewCastle,Pa. B4 .....5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 .....5.85
Readville,Mass. C14 ....5.85
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.23
SpringCity,Pa. K3 .....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ...6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 .....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2 .....6.325
Canton,O. T7 .....6.29
Carnegie,Pa. C12 .....6.00
Chicago W18 .....6.325
Cleveland A7, C20 ....6.325
Detroit P17, R7 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.00
Gary,Ind. R2 .....6.325
Hammond,Ind. L2, M13 6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2..6.325
Mansfield,Mass. B5 ..6.775
Massillon,O. R2, R8..6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2, W14 6.325
SpringCity,Pa. K3 ....6.475
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.325
Waukegan,Ill. A7 ....6.325
Worcester,Mass. A7 ...6.625
Youngstown F3, Y1 ....6.325

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..4.15
Atlanta A11 .....4.45
Buffalo R2 .....4.15
Cleveland R2 .....4.15
Emeryville,Calif. J7 ...4.90
Fairfield,Ala. T2 .....4.15
Fontana,Calif. K1 ....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.65
Ind.Harbor,Ind. I-2 ....4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.85
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ...4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ..5.05
Seattle B3, N14 .....4.90
So.Chicago,Ill. R2 ....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2..4.15
Sterling,Ill. (1) N15 ..4.90
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. T7 .....5.02
Canton,O. R2 .....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....5.025
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.375
Ind.Harbor,Ind. I-2, Y1 4.875
Johnstown,Pa. B2 .....4.875
KansasCity,Mo. S5 ....5.575
Lackawanna,N.Y. B2..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2, U5,W14 4.875
So.Duquesne,Pa. U5 ..4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.225
Bessemer,Ala. T2 .....6.225
Bethlehem,Pa. B2 .....6.225
Clairton,Pa. U5 .....6.225
Cleveland R2 .....5.925
Ecorse,Mich. G5 .....6.875
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.,Ind. I-2, Y1 6.225
Johnstown,Pa. B2 .....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ...6.225
So.SanFrancisco B3 ...6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES;H.R.CARBON
Bethlehem,Pa. B2 .....4.35

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.45
Houston S5 .....5.70
KansasCity S5 .....5.90
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....6.00
Gary,Ind. U5 .....5.00
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12, R2 5.20
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 .....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....4.92
Franklin Park,Ill. N5 ..5.20
Gary,Ind. R2 .....5.20
GreenBay,Wis. F7 ....4.925
Hammond,Ind. L2, M13 .5.20
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 .....5.20
LosAngeles R2 .....6.65
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ...5.20
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.70
NewCastle,Pa. B4 .....5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 .....5.85
Readville,Mass. C14 ....5.85
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.23
SpringCity,Pa. K3 .....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ...6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 .....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2 .....6.325
Canton,O. T7 .....6.29
Carnegie,Pa. C12 .....6.00
Chicago W18 .....6.325
Cleveland A7, C20 ....6.325
Detroit P17, R7 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.00
Gary,Ind. R2 .....6.325
Hammond,Ind. L2, M13 6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2..6.325
Mansfield,Mass. B5 ..6.775
Massillon,O. R2, R8..6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2, W14 6.325
SpringCity,Pa. K3 ....6.475
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.325
Waukegan,Ill. A7 ....6.325
Worcester,Mass. A7 ...6.625
Youngstown F3, Y1 ....6.325

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..4.15
Atlanta A11 .....4.45
Buffalo R2 .....4.15
Cleveland R2 .....4.15
Emeryville,Calif. J7 ...4.90
Fairfield,Ala. T2 .....4.15
Fontana,Calif. K1 ....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.65
Ind.Harbor,Ind. I-2 ....4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.85
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ...4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ..5.05
Seattle B3, N14 .....4.90
So.Chicago,Ill. R2 ....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2..4.15
Sterling,Ill. (1) N15 ..4.90
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Reinforcing
(Fabricated; to consumers)
Johnstown, ¼-1" B2 ...5.55
KansasCity S5 .....6.35
LosAngeles B3 .....6.18
Marion,O. P11 .....5.25
Seattle B3, N14 .....5.80
Sand Springs S5 .....6.45
So.SanFrancisco B3 ....6.25
SparrowsPt, ½-1" B2...5.55
Williamsport,Pa. S19 ....5.45

RAIL STEEL BARS
ChicagoHts.(3) C2 .....4.50
ChicagoHts.(4) C2 .....4.75
ChicagoHts.(3.4) I-2 ...4.50
Franklin,Pa.(3) F5 .....4.50
Franklin,Pa.(4) F5 .....4.75
FortWorth,Tex.(26) T4 ....4.65
Marion,O.(3) P11 .....4.15
Mojine,Ill.(3) R2 .....4.05
Tonawanda(3.4) B12 ....5.00
Williamsport(3) S19 ....5.25
Williamsport,Pa.(4) S19 ....5.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
Mck.Rks.(Staybolt) L5 15.50
Mck.Rks.(S.R.) L5 ....10.40
Mck.Rks.(D.R.) L5 ....14.00

—SHEETS—

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 .3.925
Ashland,Ky.(8) A10 ...3.925
Butler,Pa. A10 .....3.925
Cleveland J5, R2 .....3.925
Conshohocken,Pa. A3 ..4.325
Detroit M1 .....4.40
Ecorse,Mich. G5 .....4.125
Fairfield,Ala. T2 .....3.925
Fairless,Pa. U5 .....4.025
Fontana,Calif. K1 ....4.70
Gary,Ind. U5 .....3.925
Geneva,Utah C11 .....4.025
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1 3.925
Irvin,Pa. U5 .....3.925
Lackawanna,N.Y. B2..3.925
Munhall,Pa. U5 .....3.925
Niles,O. N12 .....5.425
Pittsburg,Calif. C11 ...4.625
Pittsburgh J5 .....3.925
Riverdale,Ill. A1 .....3.925
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. W14 ....3.925
SparrowsPoint,Md. B2..3.925

Steubenville,O. W10 ..3.925
Torrance,Calif. C11 ..4.625
Warren,O. R2 .....**3.925**
Weirton,W.Va. W6 ...**3.925**
Youngstown U5, Y1 ...**3.925**

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ..**5.125**
Dover,O. R1 .....5.825
Mansfield,O. E6 .....5.80
Niles,O. N12 .....5.675
Torrance,Calif. C11 ....5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....**5.90**
Conshohocken,Pa. A3 ..**6.15**
Ecorse,Mich. G5 .....**6.375**
Fairfield,Ala. T2 .....5.90
Fontana,Calif. K1 .....**7.00**
Gary,Ind. U5 .....**5.90**
Ind.Harbor,Ind. I-2 ....5.90
Ind.Harbor,Ind. Y1 ....**6.40**
Irvin,Pa. U5 .....5.90
Lackawanna(35) B2 ...**5.90**
Munhall,Pa. U5 .....5.90
Pittsburgh J5 .....5.90
Sharon,Pa. S3 .....**5.90**
So.Chicago,Ill. U5 ....5.90
SparrowsPoint(38) B2 ..**5.90**
Warren,O. R2 .....**5.90**
Weirton,W.Va. W6 ....**6.175**
Youngstown U5 .....5.90
Youngstown Y1 .....**6.40**

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier
Ashland,Ky.(8) A10 ..4.175
Cleveland R2 .....4.525
Ind.Harbor,Ind. I-2 ..4.175
Warren,O. R2 .....4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)
Butler,Pa. A10 .....4.775
Cleveland J5, R2 .....**4.775**
Ecorse,Mich. G5 .....**4.975**
Fairfield,Ala. T2 .....4.775
Fairless,Pa. U5 .....4.875
Follansbee,W.Va. F4 ..**5.775**
Fontana,Calif. K1 ....**5.875**
Gary,Ind. U5 .....4.775
GraniteCity,Ill. G4 ....5.275
Ind.Harbor,Ind. I-2, Y1 **4.775**
Irvin,Pa. U5 .....4.775
Lackawanna,N.Y. B2 ..4.775
Middletown,O. A10 ....4.775
Pittsburg,Calif. C11 ..5.725
Pittsburgh J5 .....4.775
SparrowsPoint,Md. B2..4.775
Steubenville,O. W10 ..4.775
Warren,O. R2 .....**4.775**
Weirton,W.Va. W6 ....4.775
Youngstown Y1 .....4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....7.225
Ecorse,Mich. G5 .....**7.675**
Fontana,Calif. K1 .....**8.275**
Gary,Ind. U5 .....7.225
IndianaHarbor,Ind. Y1 .**7.725**
Irvin,Pa. U5 .....7.225
Lackawanna(37) B2 ...**7.225**
Pittsburgh J5 .....7.225
SparrowsPoint (38) B2.7.225
Warren,O. R2 .....**7.225**
Weirton,W.Va. W6 ...**7.475**
Youngstown Y1 .....**7.725**

SHEETS, Cold-Rolled Ingot Iron
Butler,Pa. A10 .....5.275
Cleveland R2 .....5.375
Middletown,O. A10 ....5.275
Warren,O. R2 .....5.375

SHEETS, Gal'd No. 10 Steel
AlabamaCity,Ala. R2 ..**5.275**
Ashland,Ky.(8) A10 ..5.275
Canton,O. R2 .....**5.275**
Dover,O. R1 .....5.475
Fairfield,Ala. T2 ....**5.275**
Gary,Ind. U5 .....5.275
GraniteCity,Ill. G4 ....**5.475**
Ind.Harbor,Ind. I-2 ..5.325
Irvin,Pa. U5 .....5.275
Kokomo,Ind. C16 ....5.375
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....**6.275**
Pittsburg,Calif. C11 ..6.025
SparrowsPoint,Md. B2 **5.275**
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ..**6.025**
Weirton,W.Va. W6 ....**5.275**

SHEETS, Galvanized No. 10, High-Strength Low-Alloy
Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2 .**8.075**

SHEETS, Galvanized Ingot Iron No. 10 flat
Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Culvert

	Cu Alloy	Cu Fe
Ashland,Ky. A1	.6.325	....
Canton,O. R2	...6.475	6.925
Fairfield(41)	T2..6.075	6.325
Gary,Ind. U5	..6.075	6.325
Ind.Harbor I-2	.6.075	6.325
Irvin,Pa.(41)	U5..6.075	6.325
Kokomo,Ind.	C16 6.525	....
MartinsFry.,O.	W106.075	....
Pitts.,Cal.C11(41)	6.825	....
SparrowsPt.	B2 .6.075	....
Torrance,Calif.	C11 6.625	....

SHEETS, Culvert Pure Iron
Ashland,Ky. A10 .....**6.575**
Fairfield,Ala.(41) T2...6.325
MartinsFerry,O. W10 ..6.325

SHEETS, Galvannealed Steel
Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825
Kokomo,Ind(13) C16 ..5.925
Niles,O. N12 .....6.825

SHEETS ZINCGRIP STEEL
Butler,Pa. A10 .....5.525
Middletown,O. A10 ....5.525

SHEETS, ZINCGRIP Ingot Iron
Butler,Pa. A10 .....5.775
Middletown,O. A10 ....5.775

SHEETS, Electro Galvanized
Cleveland R2 (28) **6.125**
Niles,O. R2 (28) **6.125**
Weirton,W.Va. W6 ....**5.775**

SHEETS, ALUMINIZED
Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron
Ashland,Ky.(8) A10 ...5.175
Cleveland R2 .....**5.175**
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ...**5.875**
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Youngstown Y1 .....**5.175**

BLUED Stock, 29 ga.
Yorkville,O. W10 .....7.20
Follansbee,W.Va. F4 ...**7.30**
Follansbee (23) F4 ..7.175

SHEETS, Long Terne Steel (Commercial Quality)
BeechBot'tm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....5.675
Niles,O. N12 .....6.27
Weirton,W.Va. W6 ....5.67

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ....6.075

SHEETS, Wall Casing
Fontana,Calif. K1 ....**5.34**

—STRIP—

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(28) R2 ..3.925
Alton,Ill. L1 .....*4.20*
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.475
Bessemer,Ala. T2 ....3.925
Bridgeport,Con.(10)S15 4.425
Buffalo (27) R2 .....3.925
Butler,Pa. A10 .....3.925
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.325
Detroit M1 .....4.40
Ecorse,Mich. G5 .....4.225
Fairfield,Ala. T2 ....3.925
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.425
Ind.Harbor,Ind. I-2 ..3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5..4.625
Lackw'na,N.Y.(32) B2.3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. B6 .....4.35
Minnequa,Colo. C10 ....*5.025*
NewBritain(10) S15 ....4.425
N.Tonawanda,N.Y. B11.3.925
Pittsburg,Calif. C11 ...4.675
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3 .....4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(25) B3.4.675
SparrowsPoint,Md. B2 .3.925
Torrance,Calif. C11 ...4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....4.025
Youngstown Y1, U5 ...3.925

STRIP, Hot-Rolled Alloy
Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.45
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.90
KansasCity,Mo. S5 .....7.10
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.45
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy
Bessemer,Ala. T2 .....**5.65**
Conshohocken,Pa. A3 ..6.20
Ecorse,Mich. G5 .....6.50
Fairfield,Ala. T2 .....5.65
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ...6.00
LosAngeles(25) B3 ....6.40
Seattle(25) B3 .....6.65
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25)B3 ..6.40
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6.....6.30
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron
Ashland,Ky.(2) A10 ...4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon
Anderson,Ind.(40) G6 ..5.80
Bridgeprt,Conn.(10) S15..6.15
Bulter,Pa. A10 .....5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....6.05
Detroit D2 .....5.95
Detroit M1 .....5.45
Dover,O.(40) G6 .....5.80
Ecorse,Mich. G5 .....5.65
Follansbee,W.Va. F4 ...5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill.(40 T6.5.70
Ind.Harbor,Ind. I-2 ...5.70
Lackawanna,N.Y. B2 ...5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 ....5.45
NewBritain(10) S15 ....6.15
NewCastle,Pa.(14) B4 ...5.45
NewCastle,Pa. E5 .....5.95
NewHaven,Conn. A7 ...5.95
NewHaven,Conn. D2 ...6.20
Pawtucket,R.I. R3 .....*6.80*
Pawtucket,R.I.(21) N8..6.65
Riverdale,Ill. (40) A1 ...5.70
Rome,N.Y.(29) R6 .....5.45
Sharon,Pa. S3 .....5.80
SparrowsPoint,Md. B2 ..5.45
Trenton,N.J. R5 .....*7.00*
Wall'ford,Conn. W2(50) .6.40
Warren,O.(40) T5 .....*5.95*
Warren,O. R2 .....5.45
Weirton,W.Va. W6 .....5.45
Worcester,Mass. W19....7.05
Youngstown C8 .....5.95
Youngstown Y1 .....5.45

STRIP, Cold-Rolled Alloy Steel
Bridgeprt,Conn.(10)S15 12.15
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
NewBritn,Conn.(10)S15 12.15
Pawtucket,R.I.(11) N8.12.15
Pawtucket,R.I.(12) N8.12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ..12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy
Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 .....*7.90*
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.50
Lackawanna,N.Y. B2 ...8.15
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. 8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 .....8.30
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron
Warren,O. R2 .....6.05

STRIP, Electro Galvanized
Dover,O. G6 .....5.70
Warren,O. T5 .....**5.70**
Weirton,W.Va. W6 ....**5.10**
Youngstown C8 .....5.95

TIGHT COOPERAGE HOOP
Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.55
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Div. H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept., Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur D. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Co.

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lake Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellianceDiv.,EatonMfg.
R9 Rome Mfg. Co.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I.Div.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div.,Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel Co.

Y1 Youngstown Sheet&Tube

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	8.00	8.60	10.55	12.85
Bridgeport,Conn.(10) S15	6.15	8.00	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	....
Carnegie,Pa. S15	...	8.00	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Dearborn,Mich. D3	6.05	8.25	8.85	....	....
Detroit D2	6.45	7.85	8.45	10.55	....
Dover,O. G6	6.05	8.00	8.60	10.55	12.85
FranklinPark,Ill. T6	5.80	7.80	8.75	10.70	....
Harrison,N.J. C18	...	...	8.90	10.85	13.15
Mattapan,Mass. T6	6.30	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	6.15	8.00	8.60	10.55	12.85
NewCastle,Pa. B4	5.80	8.00	8.60	....	....
NewCastle,Pa. E5	5.95	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	6.70	7.95	8.55	10.50	....
NewYork W3	...	8.30	8.90	10.85	13.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	...	8.00	8.60	10.55	12.85
Worcester,Mass.,Base	6.65	7.95	8.90	10.85	13.15
Sharon,Pa. S3	...	8.00	8.60	10.55	12.85
Trenton,N.J. R5		*8.30*	*8.90*	*10.85*	*13.15*
Wallingford,Conn. W2	6.65	7.95	8.90	10.85	13.15
Warren,O. T5	*6.20*	*8.00*	*8.60*	*10.55*	*12.85*
Weirton,W.Va. W6	5.80	8.00	8.60	10.55	12.85
Worcester,Mass. A7	5.75	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.30	7.95	8.90	10.85	13.15
Youngstown C8	...	8.00	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.50	15.00	....
FranklinPark,Ill. T6	...	...	12.50	15.00	18.00
Trenton,N.J. R5			*12.50*	*15.00*	*18.00*
Harrison,N.J. C18	...	...	12.50	15.00	18.00
New York W3	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Youngstown C8	...	...	10.30	12.50	15.35

SILICON STEEL

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	8.35	9.60	10.40
Brackenridge,Pa. A4			*8.85*	*10.10*	*10.90*
GraniteCity,Ill. G4 (cut lengths)	...	...	8.55	9.80	...
IndianaHarbor,Ind. I-2	8.05	8.35	8.85	(34)	...
Mansfield,O. E6 (cut lengths)	7.55	7.85	8.35	9.60	10.40
Newport,Ky. N9 (cut lengths)	...	7.85	8.35	9.60	10.40
Niles,O. N12 (cut lengths)	7.05	7.35	7.85	...	...
Vandergrift,Pa. U5	...	8.35	8.85	10.10	10.90
Warren,O. R2	8.05	8.35	8.85	10.10	10.90
Zanesville,O. A10	...	8.35	8.85	10.10	10.90

SHEETS, SILICON (22 Ga. Base) COILS (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	10.95	11.50	12.20	13.00
Brackenridge,Pa. A4	*11.45*	....	....	....
Newport,Ky. N9 (cut lengths)	10.95	....	....	....
Vandergrift,Pa. U5	11.45	12.00	12.70	13.50
Warren,O. R2	11.45	....	....	....
Zanesville,O. A10	11.45	12.00	12.70	13.50

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	16.05	16.55
Vandergrift,Pa. U5	14.00	14.85	15.85	16.35

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	...	...
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.06

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	....
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2,Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburgh,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING

Black Plate (29 gage)

Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.55

MANUFACTURING TERNES

(Special Coated)

Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb

Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.75

—WIRE—

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Atlanta A11	5.775
Alton,Ill. L1	5.75
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	6.02
Houston S5	5.925
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	*5.775*
Monessen,Pa. P7	*5.525*
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.725
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill. (1) N15	5.525
Struthers,O. Y1	5.525
Torrance,Calif. C11	6.475
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.15
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1 (43)	6.25
Johnstown,Pa. B2	6.925
Millbury (12) N6 (43)	8.725
Minnequa,Colo. C10	*7.175*
Monessen,Pa. P7	*6.925*
Monessen,Pa. P16	6.95
Muncie,Ind. I-7 (43)	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Roebling,N.J. R5	*7.225*
Portsmouth,O. P12	6.925
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.85
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	*6.875*
Monessen,Pa. P7	*6.625*
Monessen,Pa. P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	*6.925*
So.Chicago,Ill. R2	*6.625*
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Torrance,Calif. C11	7.575
Trenton,N.J. A7	6.925
Waukegan,Ill., A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving (8"Coils)

Alton,Ill. L1	*10.75*
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.05
Cleveland (42) A7	10.55
Crawf'sville,Ind. M8	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2 (43)	8.90
Kokomo,Ind. C16	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	*10.85*
So.SanFrancisco C10	10.90
Waukegan,Ill.(42) A7	10.55
Worcester,Mass.(42) A7	10.85
Worcester,Mass. T6	10.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.50
Johnstown,Pa. B2	9.50
Monessen,Pa. P16	9.50
Muncie,Ind. I-7 (43)	9.70
Roebling,N.J. R5	*9.80*
SparrowsPt.,Md. B2	9.60

ROPE WIRE (A)

Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	*9.65*
SparrowsPt., B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead

Alton,Ill. L1	*12.75*
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.00
Roebling,N.J. R5	*12.85*

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Crawf'sville,Ind.M8(4)	7.55
Dover,O. G6	7.45
Fostoria,O. S1 (43)	6.90
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	*7.45*
Monessen,Pa. P16	6.95
Monessen,Pa. P7	*7.45*
Pawtkt.R.I.(12) N8	7.75
Trenton,N.J. R5	*7.25*
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)

	An'ld.	Galv.
AlabamaCity R2	6.675	7.075
Aliquippa J5	6.075	6.525‡
Atlanta A11	6.925	7.475
Bartonville(19)K4	6.675	7.225
Buffalo W12	6.675	7.075
Cleveland A7	6.675	....
CrawfordsvilleM8	6.775	7.325
Donora,Pa. A7	6.675	7.075
Duluth,Minn. A7	6.675	7.075
Fairfield T2	6.675	7.075
Houston,Tex. S5	7.075	7.475
Johnstown B2(48)	6.675	7.225
Joliet,Ill A7	6.675	7.075
KansasCity,Mo.S5	7.275	7.675
Kokomo C16	6.775	7.175
LosAngeles B3	7.625	....
Minnequa C10	*6.925*	*7.325***
Monessen P7	*6.675*	*7.225*
Palmer W12	6.975	7.375
Pitts.,Calif. C11	7.625	8.025
Prtsmth.(18)P12	6.575	....
Rankin A7	6.675	7.075
So.Chicago R2	6.075	6.325
So.S.Frn. C10	*7.625*	*8.025***
Spar'wsPt. B2(48)	6.775	7.325
Sterl'g(1)(48)N15	6.675	7.225
Struthers,O. Y1	6.675	7.175
Worcester A7	6.975	....

*Based on 14c zinc; ‡14.50c zinc; ‡17.5c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)

	An'ld.	Galv.	Stone	Stone
Aliquippa J5 (43)	10.15	12.15		
Bartonville(19)K4	10.73	12.51		
Cleveland A7	12.50	....		
CrawfordsvilleM8	12.50	14.35		
Fostoria,O. S1	12.00	14.15		
Johnstown B2	12.50	14.35		
Kokomo C16	12.60‡	14.15‡		
Min'qua C10	*12.75*	*14.45***		
Palmer,Mass.W12	12.50	14.05		
Pitts.,Calif. C11	12.85	14.40		
SparrowsPt. B2	12.60	14.45		
Sterling(1) N15	10.73	12.15		
Waukegan,A7	12.50	14.05		
Worcester A7	12.80	....		

*Based on 14c zinc; ‡14.50c zinc; **, subject to zinc equalization extras.

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	153
Aliquippa,Pa. J5	148‡
Atlanta A11	159
Bartonville,Ind.(19) K4	156
Crawfordsville,Ind. M8	159
Donora,Pa. A7	153
Duluth,Minn A7	153
Fairfield,Ala. T2	153
Houston,Tex. S5	161
Johnstown,Pa. B2	156
Joliet,Ill. A7	153
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155
Minnequa,Colo. C10	*159***
Monessen,Pa. P7	*157*
Pittsburg,Calif. C11	173
Rankin,Pa. A7	153
So.Chicago,Ill. R2	153
S.San.Francisco C10	*173***
SparrowsPoint,Md. B2	158
Sterling,Ill.(1) N15	156

*On 14c zinc; ‡17.5c zinc; **, subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	149
Aliqu'pa,Pa.9-14½ga. J5	139‡
Atlanta A11	146
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17ga.,6" B2	234
Johnstown, 4"	237
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	*148***
Monessen,Pa. P7	138
Pittsburg,Calif. C11	163
Rankin,Pa. A7	140
So.Chicago,Ill. R2	140
Sterling,Ill. (1) N15	143

*On 14c zinc; ‡17.5c zinc; **, subject to zinc equalization extras

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	152
Bartonville,Ill.(19) K4	149
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	*154*
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

NAILS, Stock To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa J5	127
Atlanta A11	134
Bartonville,Ill. (19) K4	131
Chicago,Ill. W13	131
Cleveland A9	137
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet, Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	*136*
Monessen,Pa. P7	*131*
Pittsburg,Calif. C11	150
Portsmouth,O. P12	132
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	133
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, Cut (100 lb keg) to dealers (33)

Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished, Stock To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	126
Atlanta A11	136
Bartonville,Ill. (19) K4	133
Bartonville,Ill. (19) K4	133
Crawfordsville,Ind. M8	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10	*138*
Monessen,Pa. P7	*133*
Pittsburg,Calif. C11	152
Portsmouth,O. P12	132
Rankin,Pa. A7	133
So.Chicago,Ill. R2	131
SparrowsPt.Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

—FENCE POSTS—

	Col.
ChicagoHts.,Ill. C2, I-2	145
Duluth,Minn. A7 (49)	143
Franklin,Pa. F5	145
Johnstown,Pa. B2	148
Marion,O. P11	140
Minnequa,Colo. C10	*150*
Moline,Ill. R2	*145*
So.Chicago,Ill. R2	*145*
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

SEAMLESS STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (†)	18.25	...	22.25	...	24.75	...	26.25	...	26.25	...	26.00	...	28.50	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.50	23	8.75	25.5	11.25
Youngstown Y1 (††)	15.75	list	19.75	2.50	22.25	5.00	23.75	6.50	23.75	6.50	23.00	5.75	25.50	8.25

ELECTRIC WELD STANDARD PIPE, T & C

Youngstown R2 (††)	15.75	list	19.75	2.5	22.25	5.0	23.75	6.5	23.75	6.5	23.0	5.75	25.5	8.25

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv.	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv.
Aliquippa, Pa. J5 (††)	....	....	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 (§)							23.25	7	26.25	11	28.75	14.5	31.25	15.5	31.75	16.5
Benwood, W.Va. W10(††)	25.5	+0.75	17.75	+6	10.25+10.75		26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Butler, Pa. F6 (†)	26.5	+2.75	19.5	+7.25	12.5 +13		....	....	....	....	....	....	....	....	....	....
Etna, Pa. N2 (†)	28	+1.25	22	+4.75	16	+9.5	28.75	9.5	31.75	13.5	34.25	17	36.75	18.75	37.25	19.75
Fontana, Calif. K1 (††)	....	....	....	....	....	....	13.25	+2	16.25	1	19.25	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (††)	....	....	....	....	....	....	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	....	....	....	....	....	....	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (†)	28	+1.75	22	+1.75	16	+5	....	....	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Sparrows Pt., Md. B2	28.5	+0.75	23	+3.75	18	+7.5	30.5	11.25	33.5	15.25	36	18.75	36.5	18.5	37	19.5
Youngstown R2 (††)	....	....	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Youngstown Y1 (††)	....	....	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9	28.5	+0.75	23	+3.75	18	+7.5	32.5	13.25	35.5	16.25	38	18.75	38.5	19	39	19.5

Size—Inches	2		2½		3		3½		4	
List Per Ft.	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft.	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
Alton, Ill., L1 (§)	*32.25*	*17*	*33.75*	*17*	33.75	17	....	....	....	....
Benwood, W.Va. W10(††)	35.25	20	36.75	20	36.75	20	27.75	10.5	27.75	10.5
Etna, Pa. N2 (†)	37.75	20.25	39.25	21	39.25	21	30.25	11.5	30.25	11.5
Fontana, Calif. K1 (††)	22.25	7	23.75	7	23.75	7	....	....	....	....
Ind. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
Sharon, Pa. M6	35.25	20	36.75	20	36.75	20	....	....	....	....
Sparrows Pt., Md. B2	37.5	20	38	19.75	38	19.75	....	....	....	....
Youngstown R2 (††)	35.25	20	36.75	20	36.75	20	27.75	10.5	27.75	10.5
Youngstown Y1 (††)	35.25	20.00	36.75	20.00	36.75	20.00	....	....	....	....
Wheatland, Pa. W9	39.5	20	40	20.25	40	20.25	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 12.50c; (*), 5c; ($), 11.00c; (††), 10.50c-11.50c; with discounts adjusted depending on price of zinc at time of shipment.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft., inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld—H.R.	Elec. Weld—C.D.
1	13	14.80	18.05–18.96	....	....
1¼	13	17.53	21.38–22.45	16.93	....
1½	13	19.37–20.34	23.63–24.81	18.16	....
1¾	13	22.89–24.72	27.92–30.16	20.28	....
2	13	25.65–27.71	31.29–33.81	22.73	....
2¼	13	28.89–31.20	35.24–38.06	25.62	....
2¼	12	31.36–33.87	38.25–41.32	28.31	....
2½	12	34.54–37.31	42.14–45.52	31.19	....
2¾	12	37.40–40.39	45.62–49.28	33.77	....
3	12	39.89–43.08	48.65–52.56	35.76	....

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	Std. Tee Rails 60 lb Under
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	....
Huntington,W.Va. W7	....	....	....	5.20
Indiana Harbor,Ind. I-2	4.325	4.225	4.275	....
Johnstown,Pa. B2	....	....	...(16)	5.20
Lackawanna,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	*4.325*	*4.125*	....	*5.70*
Steelton,Pa. B2	4.325	4.225	....	....
Williamsport,Pa. S19	....	....	....	*5.20*

TIE PLATES	
Fairfield,Ala. T2	5.125
Gary,Ind. U5	5.125
Ind.Harbor,Ind. I-2	5.125
Lackawanna,N.Y. B2	5.125
Minnequa,Colo. C10	*5.125*
Pittsburg,Calif. C11	5.275
Seattle B3	5.275
Steelton,Pa. B2	5.125
Torrance,Calif. C11	5.275

TRACK BOLTS (20) Treated	
KansasCity,Mo. S5	11.00
Lebanon,Pa. (31) B2	10.75
Minnequa,Colo. C10	*11.00*
Pittsburgh P14	11.00
Pittsburgh O3	11.00

AXLES	
Ind.Harbor,Ind. S13	6.50
Johnstown,Pa. B2	6.50
Youngstown R2	7.05

JOINT BARS	
Bessemer,Pa. U5	5.275
Fairfield,Ala. T2	5.275
Ind.Harbor,Ind. I-2	5.275
Joliet,Ill. U5	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	*5.275*
Steelton,Pa. B2	5.275

STANDARD TRACK SPIKES	
Ind.Harbor,Ind. I-2, Y1	7.05
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.05
Minnequa,Colo. C10	*7.05*
Pittsburgh J5	6.65
Seattle B3	7.55
So.Chicago,Ill. R2	7.05
Struthers,O. Y1	7.05

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS (F.o.b. midwestern plants; per cent off list for less than case lots to consumers)	Light
6 in. and shorter:	
½-in. & smaller diam.	4
⅝-in. & ⅝-in.	5
¾-in. and larger	3
Longer than 6 in.:	
All diams.	+4
Lag bolts all diams.:	
6 in. and shorter	12
over 6 in. long	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoe	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS	Reg. Hvy.
H.P. & C.P. Square:	
½-in. & smaller	+2 2
⅝-in. & ⅝-in.	+7 +32
¾-in.-1½-in.	+8 +27
1⅝-in. & larger	+9 +27
H.P. Hex.:	
½-in. & smaller	11 8
⅝-in. & ⅝-in.	2 +20
¾-in.-1½-in.	+6 +25
1⅝-in. & larger	+8 +25
C.P. Hex:	
½-in. & small.	11 8
⅝-in. & ⅝-in.	9 +2
¾-in. & 1½-in.	+1 +9
1⅝-in. & larger	+16 +20

SEMIFINISHED NUTS American Standard (Per cent off list for less than case or keg quantities)	Reg.	Hvy.
½-in. & smaller.	23	14
⅝-in. & ⅝-in.	18	4
¾-in.-1½-in.	8	+8
1⅝-in. & larger.	+14	+20

SQUARE HEAD SET SCREWS (Packaged; per cent off list)	
1 in. diam x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS (Packaged; per cent off list)	
No. 10 and smaller	34
¼-in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS (F.o.b. plant, per cent off list in packages)	
Plain finish	47.5 & 10
Plated finishes	30 & 10

HEXAGON CAP SCREWS (1020 steel; packaged; per cent off list)	
6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE — Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
CARBON		
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge Iron:	
98+ % Fe, annealed	18.00
Unannealed	14.50
Swedish, c.l.f. N.Y., c.l., in bags	10.90
Electrolytic Iron:	
Annealed, 99.5% Fe.	42.50
Unannealed (99+ % Fe)	36.50
Unannealed (99+ % Fe) (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	34.00
Antimony, 500 lb lots	78.00
Brass, 20-ton lots	30.00-39.00
Bronze, 10-ton lots	52.25-60.00
Copper:	
Electrolytic	43.50
Reduced	43.50
Lead	21.75
Magnesium	75.00-85.00
Manganese:	
Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	89.50
Nickel-Silver 5-ton lots	48.50
Silicon	38.50
Solder	8.50*
Stainless Steel, 302	87.00
Zinc, 10-ton lots	17.50-25.00
Tungsten	**Dollars**
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.35
Less than 1000 lb	5.50
Chromium, electrolytic 99.9% Cr min.	3.50

* plus cost of metal.

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh; f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 8.90c
7/16-in. under ..... 26.5 off

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(15) ½" and thinner.
(16) 40 lb and under
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.05c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Add $31.50 per ton.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.85c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter: 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Plus 0.375c per 100 lb.
(43) Plus 4.7% on base and extras.
(44) Plus 45c per 100 lb.
(45) Plus 40c per 100 lb.
(46) Plus 2.2 per cent.
(48) 6-7 gage.
(49) U-post; add 2 cols. for T-post.
(50) 0.025 gage; 6.55c for 0.028 to 0.068 gage; 6.65c for 0.069 gage and over.

STAINLESS STEEL MILL PRICES

(Cents per pound; subject to current lists of extras and standard sale conditions)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars, & Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	....	34.25	29.75	35.25	....	46.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	46.50	41.50
302B ...	18.50	24.50	30.50	34.50	35.00	35.50	37.50	46.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
305	19.50	25.50	....	36.25	37.00	37.50	....	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	63.50	62.00
309S ...	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	78.75
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
317	33.00	43.50	56.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	56.25	64.50	66.25	65.50	68.75	75.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	....
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	24.50	28.25	....	29.25	....	....	....
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F ...	....	18.75	25.00	28.75	....	29.75	....	....	....
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A ...	....	28.50	29.25	34.00	....	35.00	....	....	....
440B ...	....	28.50	29.25	34.00	....	35.00	....	....	....
440C ...	....	....	29.25	34.00	....	35.00	....	....	....
446	....	....	33.75	38.25	53.00	39.50	40.75	59.75	71.00
501	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Division, U. S. Steel Corp.; Armco Steel Corp.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur D. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Co.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Division, Borg Warner Corp.; Jessop Steel Co.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; Page Steel & Wire Division, American Chain & Cable Co. Inc.; Republic Steel Corp.; Rome Mfg. Co.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Stainless Welded Products Inc.; Superior Steel Corp.; Timken Roller Bearing Co.; Tube Methods Inc.; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

(Cents per pound; add 4.7% to base price and extras)

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 10%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	....	19.75	26.24-27.50	77.00
304	25.00	29.50	24.50	27.50-27.77	77.00
309	30.50	35.00	....	....	....
310	36.50	41.00	....	....	144.00
316	29.50	34.00	26.00	35.92-36.50	....
317	34.50	39.00	....	....	....
318	33.50	38.00	....	....	....
321	26.50	31.00-32.00	23.00	33.00	111.00
347	27.50	32.00	24.00	33.50-33.83	130.00
405	21.25	27.75	....	....	....
410	20.75	27.25	....	....	....
Nickel .	33.55	45.15	....	....	....
Inconel .	41.23	54.18	....	....	165.00
Monel .	34.93	46.28	....	....	....
Copper*.	....	....	....	44.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Nickel	41.00	54.00	....	....
Copper*	27.85†	35.85†	24.00†	32.25†

* Deoxidized. Production points: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.
† Includes 4.7% on base and extras.

TOOL STEEL

(Prices subject to 4.7% increase)

Grade	$ per lb	Grade	$ per lb
Regular Carbon ...	0.230	Oil Hardening	0.350
Extra Carbon	0.270	5% Cr. Hot Work	0.350
Special Carbon	0.325	Hi-Carbon-Cr	0.635

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	3.535-3.675
19	4	2	7	...	2.460
18.25	4.25	1	4.75	...	2.125
18	4	2	9	...	2.445-2.450
18	4	2	...	...	1.650-1.660
18	4	1	...	...	1.505
13.5	4	3	...	...	1.6025
9	3.25	0.5	...	...	1.010
6.4	4.5	1.9	...	5	0.960-0.965
6	4	3	...	6	1.190
1.5	4	1	...	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

First Half Steel Output Sets Record

Tops previous peak half year, in 1951, by more than 5 million tons. Production in period at rate of 116 million tons on annual basis. June volume off

New York—Record production of ingots and steel for castings is reported by the American Iron & Steel Institute for June and the first six months of the year. June output totaled 9,419,000 net tons, comparing with 9,997,080 in May and 1,639,789 in June, 1952.

Production in the first six months at 57,960,457 net tons, was more than 5 million tons above the greatest previous half-year output of 52,895,863 tons registered in the last half of 1951. At the same time it was 13 million tons, or 29 per cent, above first half output of 45,038,295 tons in 1952.

First half production was at the rate of about 116 million tons annually, which, if achieved, would exceed the previous annual record set in 1951 by about 11 million tons.

Output in the first half was slightly more than estimated combined output last year in Russia, United Kingdom, and the Netherlands. Monthly output set a new all-time record in March, reaching 10 million tons for the first time. During the first six months of this year the U. S. steel industry operated at 99.4 per cent of capacity, comparing with 83.4 in the like period last year.

Output in the second quarter this year was 28,961,618 tons, comparing with 28,998,839 in the first quarter. Production in June was at the rate of 97.4 per cent of capacity, while the output rate for the second quarter averaged 98.7 per cent against 100 per cent in the first quarter.

The industry's production feats have been made possible by the huge expansion and improvement program of the steelmakers. National ingot capacity at the beginning of this year was 117.5 million net tons.

1953	OPEN-HEARTH Net tons	OPEN-HEARTH % of capacity	BESSEMER Net tons	BESSEMER % of capacity	ELECTRIC Net tons	ELECTRIC % of capacity	TOTAL Net tons	TOTAL % of capacity	Calculated weekly production (net tons)	No. of weeks in mos.
January	8,841,679	101.4	350,000	88.9	706,083	81.2	9,897,962	99.1	2,234,303	4.43
February	7,939,299	100.8	329,389	92.6	664,091	84.6	8,932,779	99.1	2,233,195	4.00
March	9,050,773	103.7	354,710	90.0	762,615	87.7	10,168,098	101.8	2,295,282	4.43
1st Qtr.	25,831,751	102.0	1,034,299	90.4	2,132,789	84.5	28,998,839	100.0	2,254,964	12.86
April	8,493,909	100.5	334,605	87.7	717,024	85.2	9,545,538	98.7	2,225,067	4.29
*May	8,925,163	102.3	354,577	90.0	717,340	82.5	9,997,080	100.1	2,256,677	4.43
†June	8,407,000	99.5	332,000	87.0	680,000	80.8	9,419,000	97.4	2,196,000	4.29
†2nd Qtr.	25,826,072	100.8	1,021,182	88.3	2,114,364	82.8	28,961,618	98.7	2,226,104	13.01
†1st 6 Mo.	51,657,823	101.4	2,055,481	89.3	4,247,153	83.7	57,960,457	99.4	2,240,451	25.87
1952										
1st Qtr.	24,207,329	102.5	1,168,871	87.4	1,824,524	89.1	27,200,724	100.7	2,092,363	13.00
April	7,101,199	91.1	323,006	73.2	567,935	84.1	7,992,140	89.7	1,862,970	4.29
May	7,291,865	90.6	318,642	69.9	595,135	85.3	8,205,642	89.2	1,852,289	4.43
June	1,446,927	18.6	22,862	5.2	170,000	25.2	1,639,789	18.4	382,235	4.29
2nd Qtr.	15,839,991	67.0	664,510	49.6	1,333,070	65.1	17,837,571	66.0	1,371,066	13.01
1st 6 Mo.	40,047,320	84.8	1,833,381	68.5	3,157,594	77.1	45,038,295	83.4	1,731,576	26.01

Note—The percentages of capacity in 1953 are calculated on weekly capacities of 1,969,275 net tons open-hearth, 88,934 net tons bessemer and 196,250 net tons electric ingots and steel for castings, total 2,254,459 net tons; based on annual capacities as of Jan. 1, 1953, as follows: Open-hearth 102,677,980 net tons, bessemer 4,637,000 net tons, electric 10,232,490 net tons, total 117,547,470 net tons. The percentages of capacity operated in 1952 are calculated on weekly capacities of 1,816,637 net tons open-hearth, 102,926 net tons bessemer and 157,477 net tons electric ingots and steel for castings, total 2,077,040 net tons; based on annual capacities as of Jan. 1, 1952, as follows: Open-hearth 94,973,780 net tons; bessemer 5,381,000 net tons; electric 8,232,890 net tons; total 108,587,670 net tons.

*Revised.
†Preliminary figures, subject to revision

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(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Cincinnati, San Francisco, St. Paul, 15 cents.)

	SHEETS			STRIP		BARS				PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§	Standard Structural Shapes	Carbon	Floor
Baltimore	6.20	7.64	7.81	7.00	...	6.86	7.92	12.04	6.98	6.85	7.98
Boston	6.89	7.83	9.23	7.13	...	6.87	8.10	12.28	7.06	7.13	8.26
Buffalo	6.18	7.15	9.01	6.79	...	6.35	7.45	12.17	6.59	6.68	7.88
Birmingham	6.10	7.00	8.00¶	6.30	...	6.15	8.90	....	6.35	6.35	8.65
Charlotte, N. C.	6.75	7.55	8.49	6.70	...	6.80	8.09	....	6.80	6.85	...
Chicago	6.18	7.12	8.05	6.42	...	6.28	7.30	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.47	6.72	...	6.58	7.66	12.17	6.93	6.85	7.88
Cleveland	6.18	7.12	7.90	6.58	...	6.34	7.40	11.89	6.79	6.50	7.79
Detroit	6.45	7.32	8.34	6.71	...	6.57	7.60	11.92	6.93	6.85	7.80
Houston	6.89	...	8.62	7.16	...	7.13	...	....	6.94	6.86	8.24
JerseyCity,N.J.	6.54	7.45	8.72	6.82	...	6.75	7.90	11.84	6.50	6.67	8.01
Los Angeles	7.25	9.00	9.60	7.55	11.20	7.15	9.75	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.22	6.59	...	6.45	7.57	11.92	6.63	6.50	7.63
Moline, Ill.	6.31	7.17	8.25	6.45	...	6.33	7.37	....	6.42	6.38	...
New York	6.54	7.45	8.72	6.82	...	6.75	7.90	11.84	6.50	6.67	8.01
Newark, N. J.	6.78	7.75	9.02	7.16	...	7.06	7.90	....	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	7.20	...	7.20	8.50	....	7.20	7.15	7.85
Philadelphia	6.53	7.55	8.35	7.02	8.80	6.87	7.94	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.60	6.55	...	6.28	7.40	11.75	6.46	6.33	7.46**
Portland, Oreg.	7.80	9.05	9.30	7.50	...	7.25	9.40	....	7.25	7.05	9.25
Richmond, Va.	6.50	7.45	8.00	7.10	...	7.05	7.95	....	7.10	6.85	8.10
St. Louis	6.48	7.42	8.35	6.72	...	6.58	7.70	12.05	6.86	6.73	7.86
St. Paul	6.47	7.48	8.56	6.77	...	6.64	7.78	....	6.73	6.69	7.92
San Francisco	7.35	8.70	10.15	7.60	...	7.15	9.75	13.05	7.25	7.20	9.25
Seattle (city)	8.15	8.70	10.10	8.02	...	7.58	10.13	13.50	7.50	7.59	9.40
Spokane (city)	8.45	9.25	9.80	8.40	...	7.95	10.55	13.20	7.45	7.45	9.80
Washington	6.71	8.15	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed; ** 3/8" and heavier, 8.09c for No. 12 and lighter. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ‡—500 to 9999 lb; §—1000 to 1999 lb.

Pressure for Warehouse Steel Eases

Distributors anticipate gradual pickup in demand as plants reopen following vacations. Improvement in inventories is spotty with shortages still reported in certain items

Chicago—There is a definite easing in warehouse steel demand but it is moderate. It comes partly from vacation shutdowns of some manufacturing plants and partly from a general lessening of pressure for steel by consumers. Continuing at top in demand are large bars, hot and cold-rolled sheets and structurals. Despite good receipts from the mills, inventory improvement is spotty.

Cleveland—Warehouse operators are under less pressure for shipments with the vacation season at peak, but they expect a gradual pickup from here on as manufacturing shops that have been closed since the beginning of the month resume.

In a few instances, warehouses curtailed operations during the period to permit mass vacations of their employees, maintaining only skeleton forces to care for emergency needs of customers. Such suspensions or curtailments are on a purely experimental basis.

Distributors report steady improvement in receipts from the mills, and these along with slower seasonal demands are expected to result in some gain in stocks, which continue under normal and highly unbalanced.

Little or no resistance to the higher warehouse price schedule, recently effected to reflect the advances in mill quotations, is reported.

Philadelphia—Most distributors look for business this month to be the lowest so far this year, at least in point of tonnage volume. Whether it will be the lowest in point of dollar sales remains to be seen, because of the advances in prices over recent weeks. Lag at this time is seasonal, with July usually the slowest month of the year.

Birmingham—Warehousemen in the district complain of shortages in most items. Shipments are steady and demand for most products remains consistently good.

New York—Consumer vacations are still cutting a considerable swath in warehouse business. One large distributor reports that almost half of his customers will be down this month for at least a week, if not longer, for mass vacations. However, warehouses report continued shortages of hot and cold-rolled sheets, with wide flange beams, large rounds, and heavy flats also on the critical list. Some improvement in over-all business is expected in August, with further gains anticipated after that.

Cincinnati—Big orders for galvanized sheets are moving out heavy warehouse stocks of this product. This has been a slow moving product until the government grain bin program spurred demand. Sales in other warehouse items seem to be holding up well for this time of year. Inventories remain about the same.

Los Angeles—Warehouse activity in June was 10 per cent less than in May. Sales for first half are slightly ahead of the like period in 1952 but fabricators' demand for warehouse steel is lessening. In good supply are small bars and bar-sized shapes rolled by West Coast barmakers. Still tight are large sized bars that are "imported" from eastern mills. Warehouse inventories, building tonnage-wise, are currently 65 to 75 per cent of normal.

San Francisco—Summer "dog days", a general labor strike on construction jobs in the area and a shutdown of many small plants for an annual two weeks vacation have combined to create a mild lull in warehouse business. Despite these influences, distributors' volume still is high.

The "tip off" of the general underlying strength of demand for steel products is the manner in which the two recent price increases in extras and base quotations were taken. There was hardly any complaining on the part of customers.

Seattle—June registered satisfactory volume totals in the warehouse business, but July started slowly although conditions are about the same as a year ago.

Forward Sheet Buying Substantial

No sign of slackening demand yet in evidence though summer curtailments ease market tension somewhat. Strong pressure for deliveries seen continuing into last quarter

Sheet and Strip Prices, Page 156 & 157

Cleveland—Pressure for sheets and strip, not only hot and cold-rolled, but the various specialties as well, continues strong, being little affected by manufacturing curtailments for vacations. This is seen as reflecting, in part, the limited inventories held by consumers, but it also is indicative of continued high-level manufacturing operations in prospect over remainder of summer.

Automotive requirements still are outstanding in the market. Orders are being entered for fourth quarter and no sign has been given by the auto builders of any early relaxing of demand on their part. This, in some respects, is surprising in view of reported slackening of activity by several of the smaller independent auto builders.

So far as the sheet trade is concerned, the opinion prevails that any slackening in demand that does develop will first show up in the conversion market. Conversion tonnage bulks large in the third quarter supply picture, but buyers recently have been less inclined to contract for fourth quarter conversion sheets. This is seen as indication of a tightening up in procurement policy.

Mills had substantial carryover from second to third quarter which means that new bookings in the period will be limited to the extent of the carryover, at least, scheduling of new tonnage will be delayed while old orders are cleared away. Expectations are there will be a carryover from third to fourth quarter and in certain grades some mills are reported blanking out several weeks from the fourth quarter to care for the anticipated overflow.

New York—Sheet producers report an active demand for fourth quarter, especially in hot and cold-rolled carbon sheets and certain specialties, notably electrical sheets. Most producers have opened books for that period on non-rated as well as rated tonnage but have been unable to add much to October schedules, because of anticipated arrearages. They are in much better position, however, for the succeeding two months and it appears likely they will be able to handle most of the tonnage offered.

Despite a lively interest in fourth quarter tonnage, it is generally believed that there will not be as much pressure as now exists. Certain producers anticipate fair balance between supply and demand by end of the year.

Hot strip is tight in the 5 to 9 inch widths, less tight in the sizes up to 12 and still less tight in the sizes under 5 inches. The latter are fairly easy to obtain.

Philadelphia—Consumers of hot-rolled and cold-rolled carbon sheets are still pressing for tonnage. However, seasonal influences, such as vacations and hot weather, have taken off a little of the edge and there is not the interest on the part of consumers in arranging for future conversion tonnage that there has been.

There is considerable speculation as to requirements of the automotive industry in the closing months of this year. Meanwhile, the Fairless Works has made some commitments on hot carbon sheets for August and on cold carbon for September.

Galvanized sheet demand still lags.

Pittsburgh—Fourth quarter order books are beginning to fill up at a rate which has producers forecasting no letup in orders for the balance of this year. Two out-of-town producers of carbon sheets are receiving persistent inquiries for steel at their Pittsburgh offices, indicating strength of demand in this district.

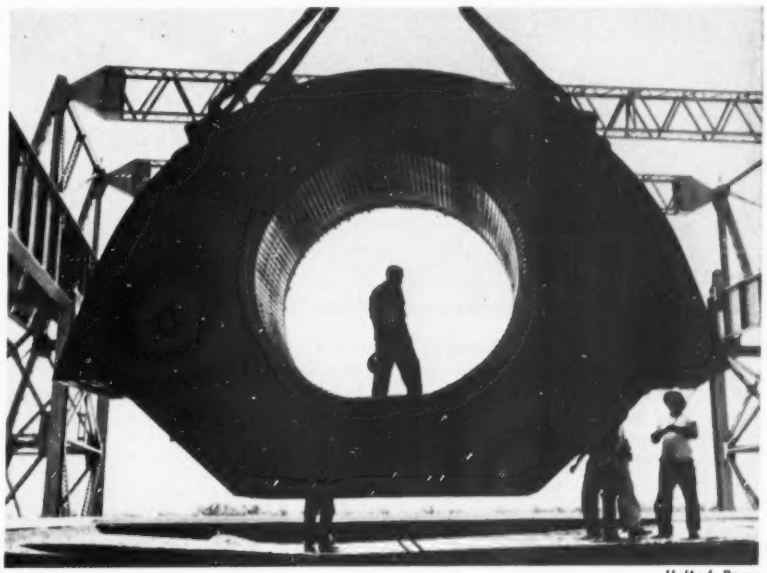
Manufacturers here report continuing strong demand for hot and cold-rolled sheets. A producer of electrical steel sheets expects operations to remain at capacity through fourth quarter, although this is too early to make a positive statement.

Cincinnati—Sheet demand continues spotty with the over-all load unchanged. It seems evident at the mill level that some appliance manufacturers are doing a better selling job than others. One manufacturer is operating at only 20 per cent of capacity, while others are running the limit. Galvanized sheets have come into fairly strong demand. Buying of cold-rolled and pickled sheets continues brisk.

Chicago—There is no catching up yet of output of hot and cold rolled sheets with demand, and prospects for such in third quarter are slim. The dizzy pace which automobile manufacture is maintaining is regarded as the strength in the present situation. The government's grain bin program, now getting under way, is creating new strength in galvanized sheets.

Birmingham—Pressure for sheets has relaxed somewhat. Opinion prevails that demand is going to taper off gradually to the extent additional tonnage will be available by the end of the year.

Los Angeles—Accumulated arrear-



United Press

Workmen Dwarfed by Huge Motor Frame

Stator, or outer frame and coils of an 83,000-horsepower motor is shown above being lifted by crane into position at Arnold Engineering Development Center, Tullahoma, Tenn. Two of these giant motors will create tornadic winds up to 2500 miles an hour in a tunnel, enabling the United States Air Force to test and evaluate supersonic planes, aircraft engines and guided missiles

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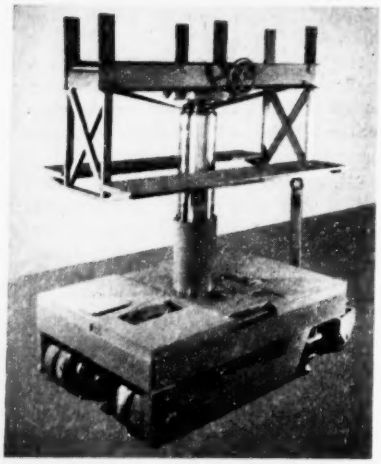

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ages coupled with installation of 2 new stands on the 86-in. hot strip mill is causing Kaiser Steel Corp., Fontana Works to fall farther behind. To work off flat-rolled carryover October has been blanked out.

Starting in first quarter Kaiser expects to be able to offer fabricators new thinner sections.

Trade experts see demand for western-rolled strip easing when many western fabricators, who turned to strip as a stop-gap when sheets were unobtainable, again use sheets when available.

San Francisco—Steel mills in this district have begun to open their books for fourth quarter. Sales executives said it was too early yet to calculate the strength of the market for the last three months of the year on the basis of orders accepted so far. However, confidence is expressed that the final period at least will start off strong. There will be heavy carryovers from third quarter on a number of items, including hot and cold rolled-sheets.

Plates . . .

Plate Prices, Page 156

Philadelphia—While not having the zip noted earlier this year, lively interest continues in plates. No balance between supply and demand is anticipated this year by most plate sellers.

Alan Wood Steel Co., Conshohocken, Pa., plants will suspend operations for two weeks beginning Aug. 15 for mass vacations, and for some maintenance and alterations work, including steps necessary for shifting from an old to a new pickling line, which is being installed at a cost of $2,500,000. Openhearth production also will be curtailed, with perhaps not more than three furnaces out of seven being kept in operation.

New York—Plate sellers report that quotas offered customers for fourth quarter are being quickly accepted, indicating a further live interest in tonnage of virtually all gages and widths. Only in the case of tonnage offered by the very high premium mills does there appear to be any particular lag.

Pittsburgh—No specific changes are foreseen in demand for carbon steel plates and structural shapes. "We'll be busy the remainder of this year," a prominent producer states, predicting continued strong demand.

Shipbuilders are buying thinner sections, indicating that ships under construction are nearing completion. Although this industry group still has work on the ways, steel is largely in place and new orders are falling off.

Although rumors circulate that a revival of buying for railroad freight

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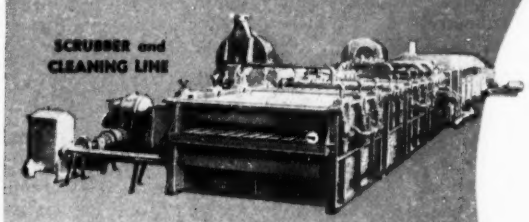
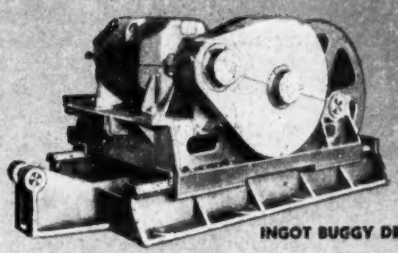
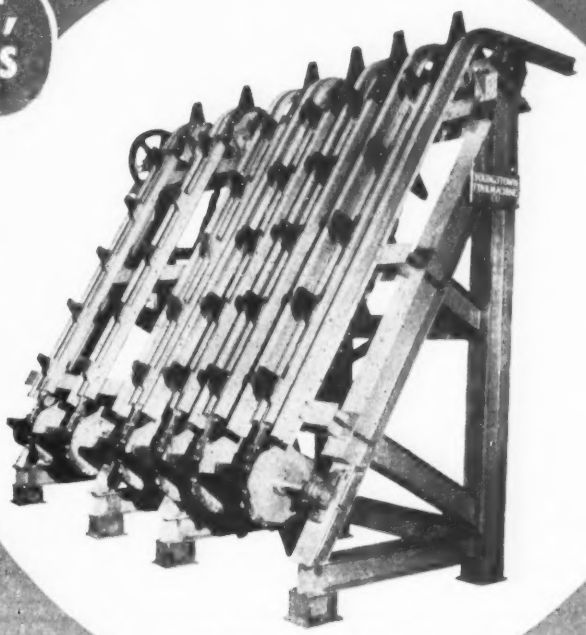


SCRUBBER and CLEANING LINE



INGOT BUGGY DRIVE



60" INCLINE BILLET ELEVATOR

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- BILLET EJECTORS—PINCH ROLL STANDS
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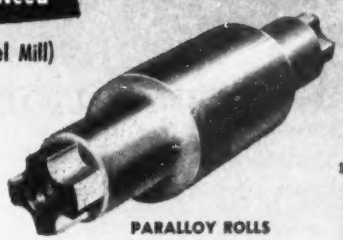
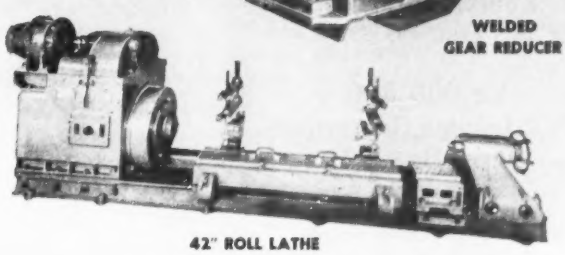
- Continuous PICKLING Lines—ROLLER LEVELERS
- FURNACE Charging Equipment—Furnace Pushers
- Strip Steel COILERS and REELS—SCRAP BALLERS
- RAILROAD Spike Forming Machines—ROLL LATHES
- Sheet GALVANIZING Lines—Wire Patenting Frames
- Stretcher Levelers—Angle and Shape Straighteners
- Rolling Mill Tables—Gear and Individual Motor Types
- DUCTILE CASTINGS (80,000 PSI.)

Machinery Built to Customer's Design and Detail Drawings



PARALLOY ROLLS

WELDED GEAR REDUCER



42" ROLL LATHE

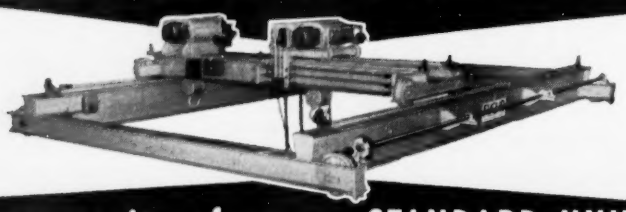
The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio

6*

EUCLID SPECIAL CRANE



a composite of proven STANDARD UNITS

As a rule a "special" Euclid Crane embodies *standard* hoisting, traveling and control units combined with scientifically engineered bridge, trolley, etc.

The purchaser obtains a crane with a full factor of five, thoroughly tested and proven components, the economy of volume production and the assurance of satisfactory performance due to years of specialized experience.

The above crane has a rigidly mounted hoist and hook; also a hoist and trolley which travels lengthwise of a secondary bridge. This permits convenient and efficient handling of bundled material of various lengths.

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Write us for a recommendation mentioning conventional or special requirements.

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1365 CHARDON ROAD • EUCLID, OHIO

NEW ISSUES July 7, 1953

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$56,000,000
First Mortgage
4¼% Sinking Fund Bonds
Due 1972

$8,000,000
5¼% Income Convertible
Notes Due 1982

Direct placement of the First Mortgage Bonds has been completed and, subject to the terms and conditions of Purchase and Loan Agreements, certain institutional investors have entered into a commitment to purchase the Income Convertible Notes.

Underwriter Distributor
Dealer
Investment Bonds
and Stocks

The
FIRST BOSTON
CORPORATION

New York Boston Pittsburgh
Chicago Philadelphia
Cleveland San Francisco

cars may take place, freight car backlogs continue to fall.

Birmingham—The need for plates continues, especially for car building. Reports are that carryover tonnage into fourth quarter is not going to be as large as anticipated but there is not too much prospect, even so, of any great plate tonnage being available.

Seattle—Partial awards of the 10,000 tons of plates involved in the General Petroleum Corp.'s refinery at Ferndale, Wash., have been placed with Consolidated Western Steel Corp. and Chicago Bridge & Iron Co. Additional contracts for tanks and other facilities are expected.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 156

Seattle—Northwest Steel Rolling Mills Inc. resumed operations July 20 following the customary semi-annual two-week shutdown. Mills have sizable backlogs but competition for new business is keen. Reinforcing department of Joseph T. Ryerson & Son Inc. reports a fair run of orders in small tonnages.

Tubular Goods . . .

Tubular Goods Prices, Page 159

Philadelphia—Demand for merchant pipe is increasingly spotty. Plumbing and heating jobbers have good stocks of buttweld on hand, and lapweld inventories are in fair balance with requirements. Sales of pipe direct to industrialists are holding up well.

Chicago—Pipemakers report that jobbers turned back about 10 per cent of their quotas of standard pipe for September but no trouble was experienced in disposing of the tonnage. More turndowns for October are anticipated. No lessening in demand for seamless is apparent. Shipments of buttweld pipe are almost current, the arrearage being only a week or so. Demand for line pipe and casing is less than a year ago. A portent for the future is that utilities are taking a second look at their programs.

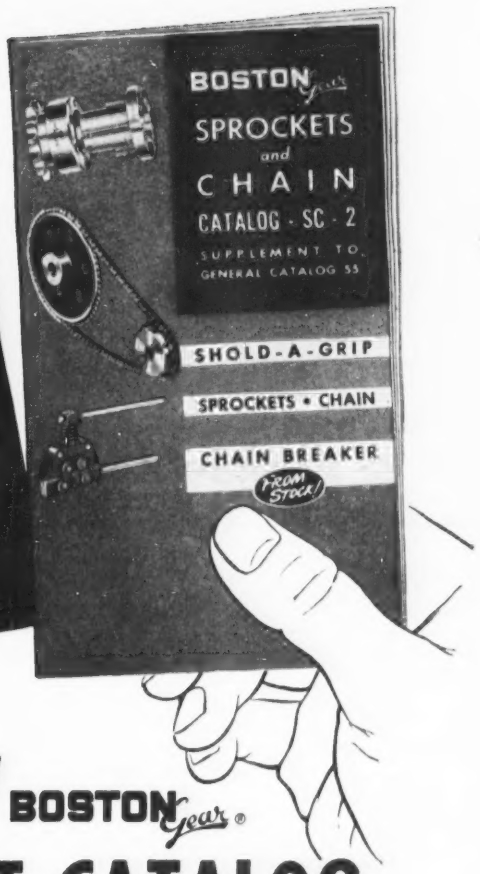
Los Angeles—Kaiser Steel Corp.'s Fontana Works produced 7 per cent more tubular goods in the first 6 months of 1953 than in any like period in its history.

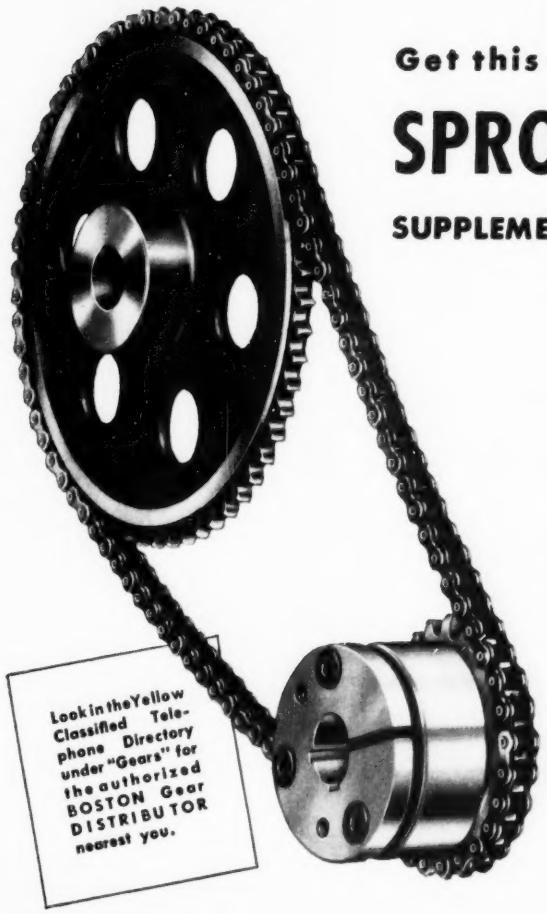
Fontana, Calif.—Kaiser Steel Corp. will build a $500,000 warehouse at its plant here for storing continuous weld pipe. Production of various sizes of pipe then can be scheduled for long, uninterrupted runs, allowing diversified requirements of different customers to be met more rapidly by drawing from stock rather than by waiting for direct production from the mill.

lower NEW PRICES

BOSTON Gear

SAME QUALITY





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THE FERRY CAP & SET SCREW CO.

2159 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038—to standards for Full Finished hexagon head cap screws—bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

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Made of AISI C-1018 steel—bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications—hexagon head hard; polished if specified — threads soft to close tolerance—points machine turned; flat and chamfered.

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Made of alloy steel—heat treated—threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

STANDARDS carried by LEADING DISTRIBUTORS

* **SPECIALS** furnished to BLUE PRINT SPECIFICATIONS

WRITE FOR INFORMATION

SEND FOR SAMPLES

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Structural Shape Prices, Page 156

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the A-B-C of M-S-T

A ALWAYS MAKES POSSIBLE
B BETTER PRODUCTS
C AT LOWER COST

Michigan
Electric Resistance
WELDED
STEEL
TUBING

A Quality Product

Vacuum Cleaner Handle

An excellent example of how the use of welded steel tubing simplifies assembly of parts, cuts down costs, is the cleaner handle made by Michigan for manufacturers of vacuum cleaners.

The handle is shipped by Michigan ready for chrome finishing and assembly to the vacuum cleaner. Stampings for the cord holders are welded to the tubing, an elongated hole punched for the interior wire cord and tumbler switch. The surface finish of the cold rolled steel tubing, as processed by Michigan, is suitable for polishing and chrome plating.

No matter what you manufacture, Michigan engineers will be pleased to consult with you concerning an application of welded steel tubing to improve your product and lower production costs.

Consult us for engineering and technical help in the selection of tubing best suited to your needs.

ROUND
3/8" to 4" O. D. 9 to 22 gauge
SQUARE-RECTANGULAR
1/2" to 2" 20 gauge, 1" to 2 3/4", 14, 16, 18 gauge
Carbon 1010 to 1025

Michigan Tubing has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Plus Fabricating of our own tubing Michigan is interested ONLY IN THE FABRICATION OF Stainless steel, copper, brass and aluminum tubing.

Michigan ELECTRIC RESISTANCE WELDED STEEL TUBING
THE OLDEST NAME IN STEEL TUBE PRODUCTS CO.

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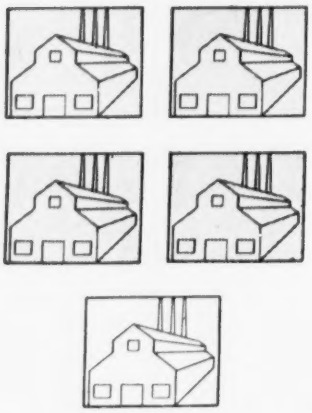
4 out of 5



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Commercial Contracting Corporation was selected to install all machinery and equipment in four of these five plants.

Currently, CCC crews are beginning to place the first shipments of more than 1,000 pieces of equipment to be housed in the sixth such huge press plant constructed in the United States since the War's end.

Erecting heavy presses and other machinery is an important part of our business.

Other CCC services, provided individually or under one PACKAGE contract, include: General Construction, Building Alterations, Demolition, Foundations, Machinery Moving, Crane and Conveyor Installing, and Steel Fabricating.

COMMERCIAL CONTRACTING CORPORATION
GENERAL CONTRACTORS
12160 Cloverdale • Detroit 4

ject to approval in Washington. Some small orders are involved in private construction but the bulk is public works. Wide flange sections continue tight.

Wire . . .

Wire Prices, Page 158

Chicago — Merchant wire products continue to reflect slackened demand, a situation considered likely to continue through third quarter except possibly for bale ties and baling wire. A pickup in the latter already is evident with last year's carryover being used up. Most manufacturers items hold in good demand although the pressure for such items as heading stock and spring grades has lost frantic character.

Philadelphia—In most wire products supply and demand are in good balance. This not only applies to merchant wire, but to manufacturers grades as well. The trend is expected to become softer before it hardens again.

Steel Bars . . .

Bar Prices, Page 156

New York—Mild carbon bars in the smaller sizes are in definitely easier demand—that is, in sizes running 2½ inches and under in diameter. This does not mean, however, demand has dropped to a point where these sizes are readily obtainable. Actually, unless there are some unexpected cancellations, supply will not be sufficient to meet requirements in the current quarter.

The situation suggests the possibility of balance between supply and demand in fourth quarter on these smaller sizes. But general stringency throughout the year is anticipated in the sizes above 2½ inches, due largely, to the likelihood of sustained shell requirements. Momentarily, alloy bar demand appears stronger than in recent weeks. Nevertheless, the situation is still on the easy side compared with earlier in the year.

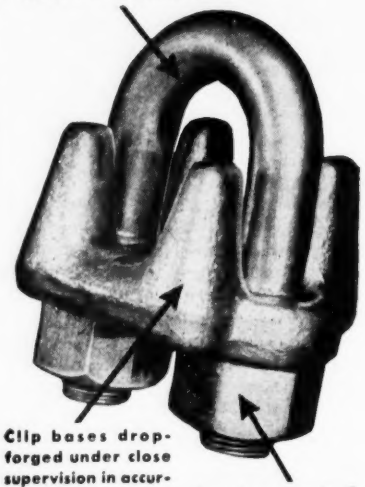
Philadelphia—A strong undertone continues in the carbon bar market, and at present most trade leaders doubt there will be balance between supply and demand before end of the year. One reason for doubt is the substantial carryover that many producers will have at the end of this quarter, and another is the prospect for continued heavy shell requirements, which would affect the larger sizes.

Pittsburgh—Producers say it's too early to gage business in fourth quarter, but confidence is growing that it will equal this year's third quarter.

While a slight decline is possible, automotive and cold drawing indus-

UPSON-WALTON
drop-forged clips
ENGINEERED FOR SAFETY

Heavy, steel U-bolt; hot galvanized after threading to prevent weakening from rust or corrosion.



Clip bases drop-forged under close supervision in accurately made dies. Bases made of high grade forging steel and hot galvanized.

American Standard heavy hex nut... hot galvanized for long life.

Upson-Walton drop-forged steel clips are made to the highest standards of quality for tough, heavy-duty service. *See your distributor* for quick and efficient service from stock. Write for free catalog on wire rope fittings

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YOU CAN DEPEND ON UPSON-WALTON'S 81 YEARS OF EXPERIENCE
Manufacturers of ALL THREE
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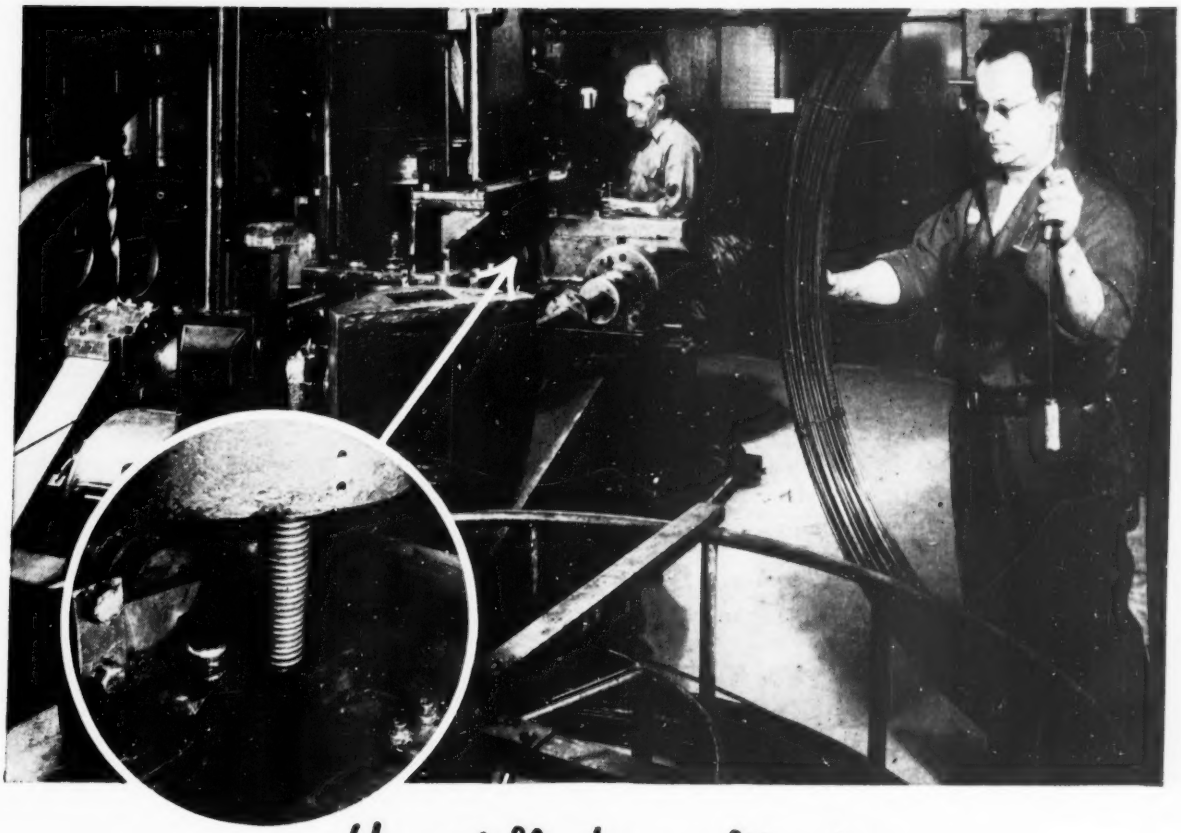

Users tell the quality story

To Produce Hundreds of Thousands of High-Quality Specialty Springs, the U. S. Steel Wire Spring Company Insists on *Uniformity* in Oil Tempered Spring Wire

Turning out fine quality custom-made springs of unique design for auto and farm machinery manufacturers has been the specialty of this well-known Cleveland, Ohio, spring maker for over 35 years . . . he knows the secrets of quality production. One of these secrets is uniformity of wire within grade specifications.

For example, the Sleeper-Hartley automatic torsion machine above makes a .243" oil tempered spring wire into some 4,400 hood hinge springs for automobiles in a day. The wire must work smoothly in production, give sturdily built springs that prove out individually under tough usage.

To meet the stiff requirements for this job, and for hundreds of other applications, U. S. Steel Wire Spring Company uses hundreds of tons of Pittsburgh Steel's Oil Tempered Spring Wire a year in a broad range of sizes. They know they can depend on it to make long runs, avoid production delays, reduce rejections, and give good service.

If you are not using Pittsburgh Steel Oil Tempered Spring Wire in the manufacture of your springs and wire specialties, why not get complete information now? Write Department S, Pittsburgh Steel Company, Grant Building, Pittsburgh 30, Pa.

Pittsburgh Wire

a product of **Pittsburgh Steel Company**

DESIGNED to SAVE!

WSM stampings are *designed to save* right from the drawing board stage to final fabrication on our 40 to 1000 ton capacity presses.

Why make component parts in your own plant the hard way — on expensive machinery that may never "earn its keep"?

Here — WSM offers 70 years experience in metal engineering, plus the most modern equipment for producing light, medium and heavy stampings, deep drawn to all shapes and sizes.

WORCESTER STAMPED METAL ©

Send blueprint or samples of your next job.

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10 HUNT ST., WORCESTER, MASS., U. S. A.

SPECIALISTS IN SKILLED STAMPING SERVICE

S STANDS FOR *Sterling* AND *Satisfaction!*

The "S" stamped on the back of every Sterling Wheelbarrow symbolizes Sterling quality and satisfaction in barrow transportation. It is our way of letting you know that Sterlings are built from the finest materials by skilled craftsmen.

STERLING WHEELBARROW CO., MILWAUKEE 14, WIS.

Welded tray, all-steel construction with reinforced tubular steel frame, channel steel legs and roller bearing wheel with pneumatic tire. Assures smooth wheeling and perfect balance.

***Sterling* WHEELBARROWS**

A 5479-½

tries are keeping up their buying steadily. Agricultural implement makers' orders have been falling off but now show signs of recovering. Some backup of dealers' stocks is reported, at more than a seasonal rate, indicating trend towards a buyers' market.

Cleveland—Except for seasonal influences, the merchant bar market presents much the same appearance as it has for months past. Demand pressure is off some because of vacation curtailments, but consumers are continuing to take shipments and are entering orders for fourth quarter.

While there is some expectation of a slackening in demand during fourth quarter little has developed in the market to indicate requirements will be in balance with supplies before yearend.

Conditions in fourth quarter, of course, will depend in large measure on how automotive and military needs hold up. Expectations are there will be little relaxing in demand on military account which means large-size bars will continue in short supply for months ahead. Market authorities, however, are not so certain about automotive requirements. While these continue pressing, some signs of slackening activity is noted among the smaller independent automobile manufacturers, but it is not yet clear if these are of particular significance.

Cincinnati—There is virtually no change in the bar market picture here. Demand is steady.

San Francisco—Hot-rolled and cold-finished bars are in fair supply. These items are produced by Pacific Coast mills, but the larger rounds in the heavier sections, not produced on the coast, are extremely difficult to obtain.

Ferroalloys . . .

Ferroalloy Prices, Page 177

Pittsburgh—By end of this month, Electro Metallurgical Co. expects to have new facilities in operation at its plant in Alloy, W. Va., which will double the company's capacity for producing medium-carbon ferromanganese. This grade contains 1.25 to 1.50 per cent carbon and is used in making steels having carbon specifications too low to permit the use of standard ferromanganese, but which do not require the use of low-carbon grade.

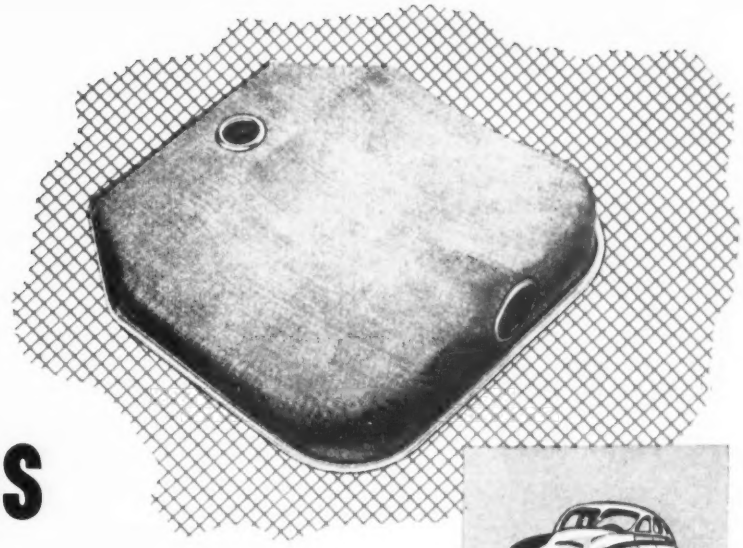
Stainless Steel . . .

Stainless Steel Prices, Page 160

Washington—Oil and gas operators who want priorities in obtaining nickel-bearing stainless steel must file purchase orders for the steel with the Petroleum Administration for De-

(*Please turn to page* 179)

for *better* OIL STRAINERS in automatic transmissions



Cleaner oil betters performance, lengthens life. But an oil strainer can be no better than its wire cloth. So what? So *what* wire, or rather *whose* wire, makes a big difference.

Reynolds Wire Cloth is made to meet special-needs demands—all the way! From metal to mesh . . . from wire to weave . . . from ductility to durability. Its specifications are *your specifications*—its quality matches your products' quality. In any industrial application — automotive to agricultural.

Fifty-four—that's the measure of Reynolds wire cloth manufacturing experience, *in years*. By any other yardstick Reynolds measures up—from research to reliability. Put your problem to Reynolds engineers. No cost or obligation.

Automobiles

Trucks

Military Vehicles

Tanks

Locomotives

Reynolds WIRE CLOTH protects performance

REYNOLDS WIRE DIVISION, NATIONAL-STANDARD CO., **DIXON, ILLINOIS**

Divisions of National-Standard Co.

ATHENIA STEEL... *Clifton, N. J.*	.....	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD... *Niles, Mich.*	.....	Tire Wire, Fabricated Braids and Tape
WAGNER LITHO MACHINERY... *Jersey City, N. J.*	.....	Metal Decorating Equipment
WORCESTER WIRE WORKS... *Worcester, Mass.*	.....	Round and Shaped Steel Wire, Small Sizes

NS NATIONAL-STANDARD Company NILES, MICHIGAN

"...As I see it, the new Mathews Loadstar Trolley is just the thing for this job."

● There is a lot of that kind of talk these days about this rugged newcomer to the 4" trolley conveyer field. Over a period of five years *Mathews* engineers have developed this new top-quality precision wheel, the No. 4207 *Loadstar*, for those conveying jobs which demand unusual stamina. Your nearby *Mathews* representative has full information on this high-quality trolley. Have him tell you about it and write today for Bulletin LS-1 announcing and describing it in detail.

MATHEWS CONVEYER COMPANY

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PACIFIC COAST DIVISION

Mathews Conveyer Company West Coast San Carlos, California

CANADIAN DIVISION

Mathews Conveyer Company, Ltd., Port Hope, Ont.

ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in *Italic*.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	22.00
North African hematites (spot)	24.00-26.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$55.00
Domestic scheelite, mine	63.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.21 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 90-93c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom. $32

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89.00; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $99.30; Salina, Pa., $104.55; Niles, O., $109; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $99.30; Hays, Pa., $105.10; Niles, O., $107; E. Chicago, Ind., Joliet, Rockdale, Ill., $109.70; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $179.55; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $186.90.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $69.30; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $92.40; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $127; Johnstown, Pa., $127.30; Clearfield, Pa., $135; St. Louis, $138; Athens, Tex., $140.90.

Nozzles

Reesdale, Pa., $203.20; Johnstown, Pa., $208.40; Clearfield, Pa., $219.45; St. Louis, $224.65; Athens, Tex., $225.20.

Runners

Reesdale, Pa., $158.20; Johnstown, Pa., $161.70; Clearfield, Pa., $168.60; St. Louis, $170.30; Athens, Tex., $174.40.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $166.30; Danville, Ill., $169.30.
60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $210.20; Danville, Ill., $213.20.
70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $244.85; Danville, Ill., $247.85; Clearfield, Pa., $252.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connelsville, foundry	16.50-17.00
New River foundry	20.80
Wise county foundry	15.95
Wise county, furnace	15.20

Oven Foundry Coke

Kearney, N. J. ovens	$24.00
Everett, Mass., ovens	
New England, del.	*26.00
Chicago ovens	24.50
Chicago, del.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, del.	28.12
Cincinnati, del.	25.85
Painesville, O., ovens	25.50
Cleveland, del.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	21.65
Cincinnati, del.	26.58
LoneStar,Tex. ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis, del.	26.00
St. Paul, ovens	**23.75**
Portsmouth, O., ovens	24.00
Cincinnati, del.	26.62
Detroit, ovens	25.50
Detroit, del.	26.50
Buffalo, del.	28.08
Flint, del.	28.23
Pontiac, del.	27.06
Saginaw, del.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	30.00-32.00
Industrial xylol	30.00-33.50

Per ton, bulk, ovens

Sulphate of ammonia	$44-45
Birmingham area	$49.50

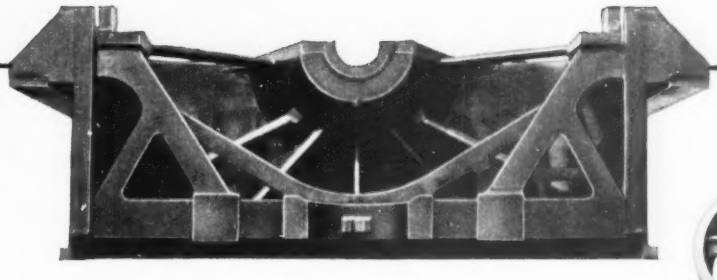
Cents per pound, ovens

Phenol, 40 (carlots, nonreturnable drums)	17.25

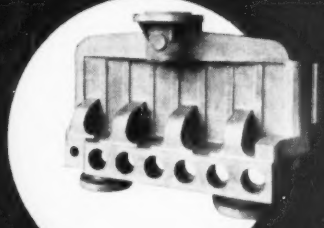
FLUORSPAR

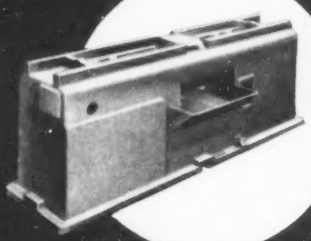
Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

big or small

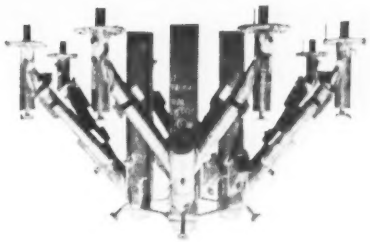


ferrous or non-ferrous



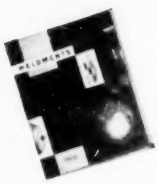


simple or intricate



you can rely on . . .

GRAVER weldments



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Graver has just completed a new authoritative booklet illustrating the many applications of Weldments in Industry. Send for your free copy. Address: Weldment Division

Quality is evident in every Graver job—whether it be a simple or intricate weldment. This is assured by Graver's complete inspection service, extra-large capacity heat-treating facilities for stress relieving, close quality control, plus the employment of the newest welding techniques by highly skilled personnel.

Carbon and alloy steels, aluminum, clad, and stainless weldments are commonplace with Graver. A complete engineering service is at your disposal, and Graver's Weldment Division will re-design your units to reduce manufacturing costs. Graver is equipped to handle thicknesses from ¼ inch to 12 inches, maintaining closest tolerances.

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WELDMENTS

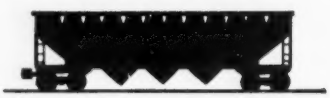
Available Now!

70 TON ALL STEEL TRIPLE CENTER DUMP HOPPER CARS

These extremely well built triple center dump hopper cars will be repaired and modernized by skilled workmen in Chicago Freight Car's own shops to meet your exact requirements and specifications.

Whether used for mainline interchange or intra-plant service, each one of these cars should prove efficient and economical to operate.

Built in 1929, these cars include as standard equipment; AB Type air brakes and power hand brakes, multiple wear steel wheels and full "U" Section Dalman Truck. There are six hoppers per car — three on each side of center sill arranged to dump crosswise of track — between the rails.

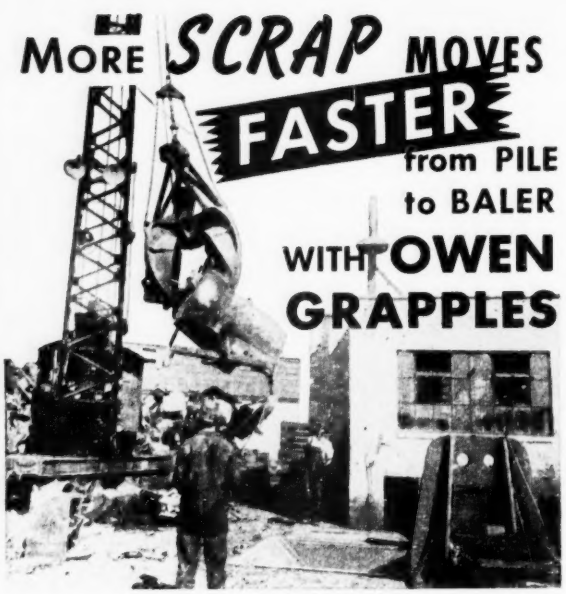


GENERAL SPECIFICATIONS

Capacity, Nominal 140,000 lbs.	**Cubic Capacity, level full** 2700 Cu. Ft.
Load Limit, average 138,800 lbs.	**Inside Length** 40 ft. 5 in.
Light Weight, average 51,200 lbs.	**Inside Width** 10 ft. 1 in.
Date Built 1929	**Height Overall** 10 ft. 8 in.

Write for specification sheet giving complete information.

MAIN OFFICE: 228 North LaSalle Street, Chicago 1, Illinois



and with a lower operating cost, too. Widespread acceptance by scrap handlers everywhere, based on performance exceeding all other scrap handling methods, makes it imperative that you INVESTIGATE OWEN SCRAP GRAPPLES.

THE OWEN BUCKET COMPANY

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BRANCHES: New York, Philadelphia, Chicago, Berkeley, Calif.

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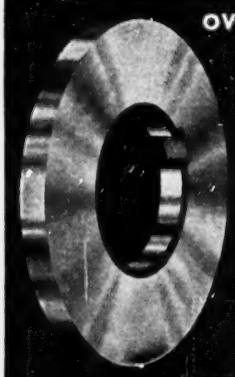
GANG SLITTING KNIVES

OVER 30 YEARS EXPERIENCE



Standard for *Service* and *Durability*. Ground to extremely close Tolerances and Finish. Made by *Toolmakers*.

COWLES TOOL COMPANY

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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $85, Palmerton, Pa.; $85, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $225 per gross ton of alloy, c.l. packed $237; gross ton lots, packed, $252; less gross ton lots, packed $269; f.o.b. Philo or Marietta, O., Lynchburg, Va.

(Mn 74-76%, C 7% approx.) Base price per net ton $200, Etna, Johnston and Sheridan, Pa. Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $267; less gross ton lots, $284, f.o.b. Chicago. Add or subtract $2.80 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

(Mn 76-80%) 13.15c per pound of contained Mn, f.o.b. Alloy, W. Va.; Niagara Falls, N. Y.; Ashtabula, O.

(Mn 79-81%) Lump, $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 0.5c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.3c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 37.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 30c; ton lots, 32c; 250 to 1999 lb, 34c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump bulk 24.75c per lb of contained Cr; c.l., packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.03% C 37.60c per lb contained Cr, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l. S M x D, bulk, 26.25c per lb of contained Cr. C.l. packed 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 26-33%, Al 7-9%, C 0.06% max.) 25.7c per lb of contained silicon plus 16.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract carload, 1" x D, packed, max 0.50% C grade, $1.12 per lb of contained chromium, ton lots $1.14, less ton $1.16. Delivered. Spot, add 5c; prices on 0.10 per cent carbon grade up 4c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 10.0c per lb of alloy, carload packed 10.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c, ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) c.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%; Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max, $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

TUNGSTEN ALLOYS

Ferrotungsten: (76-80%). 10,000 lb W or more $4.35 per lb of contained W; 2000 lb W to 10,000 lb W, $4.45; less than 2000 lb W, $4.57, f.o.b. Niagara Falls, N. Y.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c Deld. Add 0.2c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c. (Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb and Ta 60% min, C 0.30% max; ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.5c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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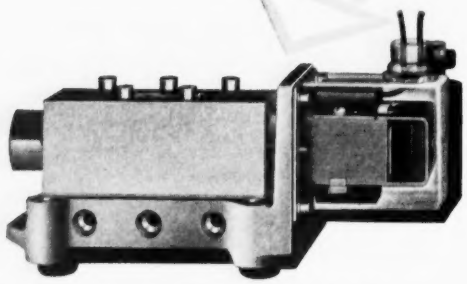

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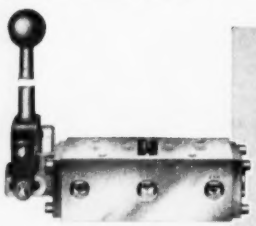

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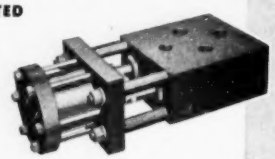

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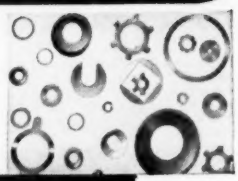

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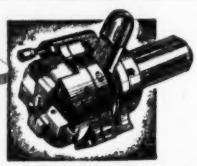

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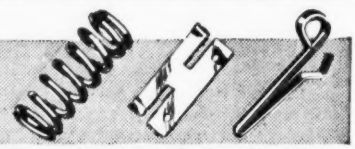

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Stainless Steel . . .

(*Continued from page* 172)

fense, according to Joseph A. LaFortune, deputy administrator. Also, no operator may self-certify for any amount of such steel, no matter how small. Only if he can obtain the steel without priorities assistance may he do so without filing a purchase order.

Nickel-bearing stainless steel will be under allocation only until the end of third quarter, 1953. No provision has been made for fourth quarter allocations.

Semifinished Steel . . .

Semifinished Prices, Page 156

Detroit—Conversion of No. 10 open hearth to a new stationary type furnace has been completed in the record time of 39 days at the River Rouge plant of Ford Motor Co., by the Rust Furnace Co., Pittsburgh. With rebuilding of No. 10 furnace the last on the line at the Rouge plant has been converted from the old tilting type to a new stationary hearth type of 400 tons capacity per heat.

Los Angeles — New record for Kaiser Steel Corp., Fontana Works, production of 770,000 net tons of ingots for first and second quarters, is 10.6 per cent more than in any like period in its history.

Pig Iron . . .

Pig Iron Prices, Page 152

Buffalo—The vacation period is reflected in current demand for merchant pig iron. One producer with a stack down for relining has a subsidiary plant down for vacation. However, other sellers report sustained demand and no necessity to pile iron.

Philadelphia—Import pig iron prices continue easier. One lot of 1000 tons of Scandinavian basic, said to be of good quality, has just been purchased by a district mill at the equivalent of $51 per gross ton, f.o.b. cars, Philadelphia, duty paid.

Domestic iron is moving moderately well considering the adverse effects of vacations and warm weather. Various foundries have completed their vacation schedules, but there are still a number that have not. Vacations will likely continue to be a factor throughout the remainder of this month and August.

The Swedeland, Pa., producer has begun to cut back on its shipments in expectation of blowing out the smaller of two furnaces for relining later in the summer. This furnace probably will be suspended in the latter part of August or early in September.

Pittsburgh—Demand for pig iron continues its gradual decline. No predictions are being made for fourth quarter, but one producer, pointing out that the market was not reacting normally to the steady rate of housing starts, hopes for a pickup this fall. Substitutes for cast iron products in housing contribute to the slow market situation.

Continuously heavy activity in ingot molds contrasts with weakening demand from agricultural equipment manufacturers. Plumbing and heating industries still lag in orders. In the least favorable position are foundries producing railroad castings and mine car wheels.

Cleveland — Merchant iron sellers anticipate active demand over remainder of the year, though greater sales efforts, it is believed, will be required to move tonnage. Currently, demand is off seasonally. However, quick comeback in ordering is indicated when the foundries resume operations.

The fact that some blast furnaces are scheduled to go down for repairs over coming months is seen as minimizing to some extent any slackening in requirements for iron which may be experienced over the next few months. Automotive requirements continue outstanding in the pig iron market.

Cincinnati—There is some indication that foundries may find the supply of pig iron to be tight after the vacation period. Many are not stockpiling and producers are selling to other customers. There is little stockpiling at the production end.

Chicago—A number of gray iron foundries are down for annual vacations and more are scheduled to close in the next few weeks. This is curtailing consumption of pig iron and also restricting demand. Most foundries, however, are accepting their full quotas from sellers.

The lower melting rate currently coincides with reduced blast furnace activity because of necessary repairs and relinings. Of the district's 43 stacks, only 39 are blowing. U. S. Steel idled its No. 6 unit at Gary July 9 for relining and Inland Steel took off its No. 1 furnace at Indiana Harbor July 14 for the same reason.

Birmingham—Pig iron producers are not nearly so hard pressed as they were a few months ago. Each merchant melter currently has a furnace down for general repairs and is able to take care of the situation right along. Some solicitation of business is evident in the territory.

Iron Ore . . .

Iron Ore Prices, Page 174

Cleveland—Ore movement from the head of the lakes continues in record

FILLING A GOVERNMENT ORDER. Final shipping inspection of air inlet horns used in jet test cell equipment. An example of the all-gage — all-metal — any quantity — spinning capacity available at Teiner. *Write for newest color brochure 52-S.*

volume. Shipments in the week ended July 13 totaled 3,265,938 tons, setting a new weekly record tonnage for July, according to latest data from the Lake Superior Iron Ore Association.

The previous July weekly record was 3,265,722 tons in the period ended July 5, 1943. In the corresponding week last year, during which time the ore mines were tied up by the steel strike, only 170,719 tons of ore were brought down from upper lake ports.

Season shipments to date this year now stand at 41,793,231 gross tons. This compares with only 21,752,304 tons in the like period of last year.

Buffalo—Bethlehem Steel Co.'s ore freighter *Johnstown* broke several records on its maiden voyage last week. The vessel carried 20,318 net tons of ore from Superior, Wis., and made the trip of almost 1000 miles in 65 hours. This compares with average trip time of 90 hours.

San Francisco—To meet increased demands by its mill, Kaiser Steel Corp. reports record production of ore at its Eagle Mountain, California iron ore mines. Ore shipments to Fontana are approximately 90 cars daily. Coal shipments are reported at 75 cars daily.

Scrap . . .

Scrap Prices, Page 182

New York—Brokers have advanced buying prices on No. 1 heavy melting steel to $37 to $37.50 and on No. 2 bundles to $28.50 to $29. Meanwhile, they are holding prices on No. 2 heavy melting unchanged at $30 to $31. They also are quoting unchanged prices on turnings, low phos and most cast grades.

Steel scrap buying is mainly for eastern Pennsylvania although a little is being shipped to the Pittsburgh area. Movement in cast grades reflects restricted operations at various foundries due to vacations and warm weather. Only change in cast is an advance in unstripped motor blocks to $24 to $25.

Buffalo—Even the recently weak cast iron market has joined in the wave of higher prices and firmer tendencies in the scrap trade here. Steelmaking grades jumped about $2 a ton on new business placed by top mill consumers. Cast advanced $3 to $3.50 on orders by a leading consumer. Buying by a Niagara Falls plant boosted turnings prices about $2.50 to $4.50.

Philadelphia—Steel scrap prices are stronger on the basis of moderate sales. No. 1 heavy melting, No. 1 bundles and No. 1 busheling have been advanced to $44 to $45 delivered, No. 2 bundles to $34 to $34.50, electric furnace bundles to $44.50 to $45. Short shovel turnings are higher at $36, structurals and plate at $46.50, and couplers, springs and wheels at $50 to $51. Cast grades are unchanged.

Particular strength in steel scrap is noted in the prime grades. Fairless Works has been an active buyer of top grades and rigid in its specifications. It has been drawing substantially from northern New Jersey, where it has a particular freight rate advantage. For instance, its rate from Newark is $3.85 against $5.36 from Newark to Coatesville and certain other eastern Pennsylvania points, and $4.24 to Bethlehem, Pa. These rates include taxes.

Pittsburgh—Scrap prices tend to rise despite slow demand in this district. Mills are keeping inventories at a "safe minimum." Activity is expected to remain lax during the remainder of this month, with no large purchases predicted. Cast grades are still inactive.

Cleveland—Seasonal influences are reflected in the current dull scrap market. Steelmakers have covered for July and are not expected back in the market for several weeks. Prices on

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steelmaking grades are firm and unchanged, however, with yard receipts off 15 to 20 per cent due to shutdown of many manufacturing plants for vacation. Somewhat easier tone is noted in blast furnace grades but a firmer tone is developing in electric furnace material with one large electric furnace operator again taking shipments following a vacation suspension.

Detroit—The scrap market situation here is substantially unchanged. Generation is running high, and about one-third of the scrap produced in the area is being shipped to Cleveland, Youngstown and Pittsburgh.

Cincinnati—The market continues strong. Movement of scrap to the mills is in good volume. There has been some price adjustment in turnings and borings with machine shop turnings falling $2 and short shovel turnings advancing $2 a ton. Prices of 18 inch rails advanced $2 and random length rails climbed $3.

Chicago—A strong scrap inventory position accompanied by a steelmaking rate that is off about 5 points because of equipment repairs and vacation schedules, are making for stability in scrap prices. With steelmaking at 99 per cent of capacity, consumption is still very heavy but receipts are down because less scrap is being generated as many manufacturing plants are closed for vacation. It is the big inventories, however, that wield the influence.

Birmingham—The scrap market here is not reflecting the renewed activity reported elsewhere. Neither have prices advanced proportionately. Some heavy steel is moving, mostly to other consuming points.

Los Angeles—Melters' consumption of cast scrap is lessened due to the holiday lull. Sales of no. 1 cupola cast are being made at $30. Movement of steelmaking scrap is slow.

San Francisco—No. 1 cupola cast last week climbed back to a firm quotation of $39 a ton delivered after sales in the preceding week were reported in the range of $37 to $39 a ton. Rise in the price of pig iron helped the scrap market. Steel grades continue steady at levels that have held for the last several weeks.

Seattle—Scrap inventories are comfortable and large consumers appear in satisfactory position. Supplies are ample for current needs. The market is firm at $31 for No. 1 and $27 for No. 2 heavy melting.

Operators of scrap yards are unable to keep their equipment busy. Operations are down 25 to 50 per cent from six months ago. The dealers are campaigning for export licenses, asserting domestic scrap prices would be $5 to $7 higher if off-shore shipments were permitted.

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Rails, Cars . . .

Track Material Prices, Page 159

New York — Freight car order backlogs have undergone further reduction, amounting to 52,315 cars as of July 1, according to the American Railway Car Institute and the Association of American Railroads. Orders in June involved 1463 units, while deliveries totaled 6463. June deliveries compared with 6582 in May and 6411 in June 1952.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6650 tons, John Sevier steam plant, Tennessee Valley Authority, McLoud, Tenn., to Ingalls Iron Works, Birmingham.

2040 tons, bridges, Ohio turnpike, awarded direct by Ohio Turnpike Commission, Columbus, O.

650 tons, trusses, purlines, etc., for roofs of Army buildings, Fairbanks, Anchorage and Ft. Richardson, Alaska, to Leckenby Structural Steel Co., Seattle. (This was erroneously listed as 1700 tons in the July 6 issue).

500 tons, superstructure, Fleming Park bridge, Stowe township, Allegheny county, Pittsburgh, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

250 tons, senior high school, Tuscaloosa, Ala., to Decatur Iron & Steel Co., Decatur, Ala.; Daniel Construction Co., South Birmingham, Ala.

220 tons, plant addition, I-T-E Circuit Breaker Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

125 tons, state bridge, Luzerne county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

10,000-12,000 tons, assembly plant, Ford Motor Co., Mahwah, N. J., bids July 27.

4000 tons, building No. 102, Manhattan state hospital, Wards Island, New York city, bids to be closed by State Department of Public Works, Albany, July 23.

586 tons, state bridge, Wyoming county, Pennsylvania, bids Aug. 7; also 154 tons of reinforcing bars.

300 tons, 47 sluice gates, McNary dam; bids to U. S. Engineer.

206 tons, state bridge, Wyoming county, Pa., bids Aug. 7.

150 tons, flood control facilities, General State Authority, Cameron and Potter counties, Pa., bids July 29.

110 tons, addition to power plant, Ladd Field, Alaska; bids in.

Unstated, electronics building; bids to Boeing Airplane Co., Seattle, July 30; plans by the Austin Co.

Unstated, steel frame addition, steam power plant No. 2; bids invited by Tacoma, Wash.

Unstated, steel frame addition, to power plant;

(*Please turn to page* 184)

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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commissions, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

July 16	$43.42
July 9	43.17
June avg.	40.50
July 1952	42.60
July 1948	41.43

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	44.00-45.00
No. 2 bundles	*41.00-42.00*
No. 1 busheling	44.00-45.00
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	31.00-32.00
Cast iron borings	30.00-31.00
Cut structurals	48.00-49.00
Heavy turnings	40.00-41.00
Punchings & plate scrap	*49.00-50.00*
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	42.00-43.00
Heavy breakable cast	40.00-41.00
Unstripped motor block	35.00-36.00
No. 1 machinery cast	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 2-ft. and under	53.00-54.00
Rails, 18-in. and under	54.00-55.00
Rails, random lengths	49.00-50.00
Rails specialties	51.50-52.50

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	44.00-45.00
No. 2 bundles	39.00-40.00
No. 1 busheling	44.00-45.00
Machine shop turnings	24.00-25.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	28.00-29.00
Cast iron borings	28.00-29.00
Low phos.	46.00-47.00
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	45.00-46.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Charging box cast	44.00-45.00
Stove plate	43.00-44.00
Heavy breakable cast	38.00-39.00
Unstripped motor blocks	27.00-28.00
Brake shoes	38.00-39.00
Clean auto cast	46.00-47.00
No. 1 wheels	40.00-41.00
Burnt cast	35.00-36.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
R.R. Malleable	49.00-50.00
Rails, 3-ft. and under	52.00-53.00
Rails, 18 in. and under	55.50-56.50
Rails, random lengths	48.50-49.50
Cast steel	50.00-51.00
Railroad specialties	52.00-53.00
Uncut tires	51.00-52.00
Angles, splice bars	52.50-53.50
Rails, rerolling	55.00-56.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	45.00-46.00
No. 2 bundles	40.00-41.00
Machine shop turnings	26.00-27.00
Short shovel turnings	31.00-32.00
Cast iron borings	31.00-32.00
Low phos.	48.00-49.00
Electric furnace bundles	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*44.00-44.50*
No. 2 heavy melting	*39.00-39.50*
No. 1 bundles	*44.00-44.50*
No. 2 bundles	*34.00-34.50*
No. 1 busheling	*44.00-44.50*
Electric furnace bundles	*44.50-45.50*
Machine shop turnings	28.00
Mixed borings, turnings	32.00
Short shovel turnings	*36.00*
Structurals & Plate	*47.00*
Heavy turnings	42.00-43.00
Couplers, springs, wheels	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Charging box cast	40.00
Heavy breakable cast	43.00
Unstripped motor blocks	29.00
Drop broken machinery	47.00-48.00

NEW YORK

(Brokers' Buying Prices)

No. 1 heavy melting	*37.00-37.50*
No. 2 heavy melting	30.00-31.00
No. 2 bundles	*28.50-29.00*
Machine shop turnings	20.00
Mixed borings, short turnings	22.00-23.00
Low phos. (structural & plate)	39.00-40.00
Shovel turnings	23.00-24.00

Cast Iron Grades

No. 1 cupola	32.00-34.00
Unstripped motor blocks	*24.00-25.00*

DETROIT

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*35.00-36.00*
Machine shop turnings	*18.00-19.00*
Mixed borings, turnings	*20.00-21.00*
Short shovel turnings	*21.00-22.00*
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	43.00
Changing box cast	34.00-35.00
Stove plate	34.00-35.00
Heavy breakable	29.00-30.00
Unstripped motor blocks	30.00
Clean auto cast	42.00-43.00
Malleable	44.00

CINCINNATI

(Delivered consumer plant)

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	44.00
No. 2 bundles	38.00
No. 1 busheling	44.00
Machine shop turnings	*23.00**
Mixed borings, turnings	25.00*
Short shovel turnings	*27.00**
Cast iron borings	25.00*

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	40.00
Heavy breakable cast	40.00
Drop broken machinery	50.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00
Malleable	*47.00*
Rails, 18-in. and under	*55.00*
Rails, random lengths	*48.00*

*F.o.b. shipping point.

CHICAGO

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	37.00-38.00
No. 1 factory bundles	42.00-43.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	35.00-36.00
No. 1 busheling	41.00-42.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	24.00-25.00
Cast iron borings	*23.00-24.00*
Cut structurals	45.00-47.00
Punchings & plate scrap	45.00-47.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Stove plate	34.00-36.00
Unstripped motor blocks	35.00-37.00
Clean auto cast	45.00-47.00
Drop broken machinery	*43.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. Malleable	*43.00-45.00*
Rails, 2-ft. and under	*53.00-54.00*
Rails, 18-in. and under	*55.00-56.00*
Angles, splice bars	*51.00-52.00*
Rails, rerolling	*54.00-55.00*

BIRMINGHAM

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	29.50-30.50
No. 2 bundles	29.00-30.00
Machine shop turnings	20.75-21.75
Short shovel turnings	22.75-23.75
Cast Iron borings	22.75-23.75
Cut structurals	39.00-40.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades
(F.o.b. Shipping Point)

No. 1 cupola	39.00-40.00
Charging box cast	30.00-31.00
Stove plate	35.00-36.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 2-ft. and under	45.00-46.00
Rails, random lengths	42.00-43.00
Angles, splice bars	45.00-46.00
Rails, rerolling	45.00-46.00

ST. LOUIS

(Brokers' Buying Prices)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	36.00-38.00
No. 1 bundles	39.00-40.00
No. 2 bundles	34.00-36.00
Machine shop turnings	19.00-20.00
Short shovel turnings	21.00-22.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	35.00-36.00
Heavy breakable cast	36.00-38.00
Unstripped motor blocks	35.00-36.00
Brake shoes	41.00
Clean auto cast	44.00
Burnt cast	34.00-35.00

Railroad Scrap

Malleable	36.00
Rails, 18-in. and under	53.00-55.00
Rails, random lengths	48.00-50.00
Uncut tires	46.00
Angles, splice bars	46.00-47.00
Rails, rerolling	51.00-53.00

BUFFALO

No. 1 heavy melting	*44.50-45.00*
No. 2 heavy melting	*40.00-40.50*
No. 2 bundles	*38.00-38.50*
No. 1 bundles	*44.50-45.00*
No. 2 busheling	*40.50-41.00*
Machine shop turnings	*26.50-27.00*
Mixed borings, turnings	*31.50-32.00*
Short shovel turnings	*33.50-34.00*
Cast iron borings	*33.50-34.00*
Low phos.	*47.50-48.00*

Cast Iron Grades
(F.o.b. Shipping Point)

No. 1 cupola	*40.00-41.00*
No. 1 machinery	*44.00-45.00*

Railroad Scrap

Rails, random lengths	*48.50-49.00*
Rails, 2 ft and under	*53.50-54.00*

BOSTON

(Brokers' Buying Prices; f.o.b. shipping points)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-28.50
No. 1 bundles	32.00-34.00
No. 2 bundles	25.00-26.00
Machine shop turnings	17.50-18.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	21.00-21.50
No. 1 cast	30.00-31.00
Mixed cupola cast	26.00-28.00
No. 1 machinery cast	38.00-39.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	31.00
No. 2 heavy melting	27.00
No. 1 bundles	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
Machine shop turnings	13.00
Mixed borings, turnings	13.00
Short shovel turnings	13.00
Electric Furnace, No. 1	38.00

Cast Iron Grades
(F.o.b. Shipping Point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	30.00-35.00
Unstripped motor blocks	27.00
No. 1 wheels	38.00-40.00
Stove plate	26.00

Railroad Scrap

Rails, random lengths	34.00-35.00

SAN FRANCISCO

No. 1 heavy melting	28.00
No. 2 heavy melting	24.00
No. 1 bundles	25.00
No. 2 bundles	22.00
No. 1 busheling	28.00
Machine shop turnings	10.00
Mixed borings, turnings	29.00
Short shovel turnings	29.00
Cast iron borings	29.00
Cut structurals	38.00
Heavy turnings	34.00
Punchings & plate scrap	37.50
Electric furnace bundles	37.00

Cast Iron Grades

No. 1 cupola	*39.00*
Charging box cast	47.00
Stove plate	46.00
Heavy breakable cast	45.00
Unstripped motor blocks	41.00
Brake shoes	41.00
Clean auto cast	52.00
No. 1 wheels	47.00
Burnt cast	41.00
Drop broken machinery	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00
Malleable	55.00
Rails, 3-ft. and under	42.00
Rails, 18-in. and under	45.00
Rails, random lengths	39.00
Cast steel	40.00
Uncut tires	39.00
Angles, splice bars	42.00
Rails, rerolling	44.00

LOS ANGELES

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	20.00
Machine shop turnings	8.00

Cast Iron Grades
(F.o.b. Shipping Point)

No. 1 cupola	38.00-40.00

HAMILTON, ONT.

(Delivered Prices)

Heavy melting	$32.50
No. 1 bundles	32.50
No. 2 bundles	32.50
Mechanical bundles	28.50
Mixed steel scrap	28.50
Mixed borings, turnings	26.50
Rails, remelting	32.50
Rails, rerolling	41.50
Busheling	26.50
Busheling new factory:	
Prep'd	30.50
Unprep'd	28.50
Short steel turnings	26.50

Cast Iron Grades†

No. 1 machinery cast	50.00

† F.o.b., shipping point.

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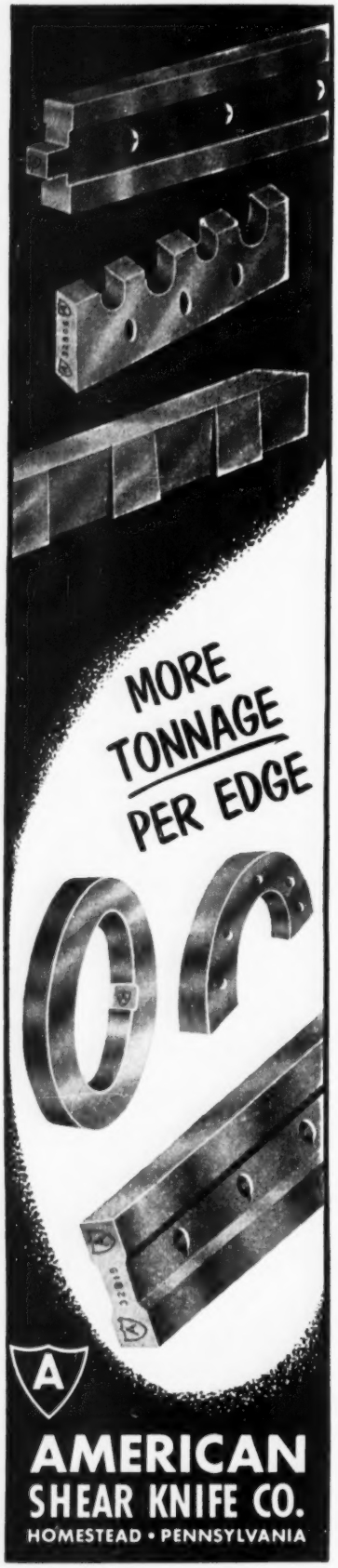

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bids to Atomic Energy Commission, Richland, Wash., Aug. 12.

REINFORCING BARS . . .

REINFORCING BARS PLACED

380 tons, senior high school, Tuscaloosa, Ala., to Virginia Steel Co., Birmingham; Daniel Construction Co., South Birmingham, Ala., general contractor.

175 tons, family quarters, Ladd Field, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Lytle, Green, Birch, Seattle, general contractors.

100 tons, warehouse, Fairchild Air Base, Spokane, Wash., to Bethlehem Pacific Coast Steel Corp. Bennett Campbell Inc., Seattle, general contractor.

100 tons, union building, Seattle, and miscellaneous, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

2000 tons, floating drydock, U. S. Navy; general contract to General Construction Co., Seattle.

1000 tons, concrete penstock, Chandler pumping plant, Columbia Basin project; general contract to A. J. Cheff Construction Co., Seattle, low $1,957,713.

154 tons, state bridge, Wyoming county, Pennsylvania, bids Aug. 7; also 586 tons of structurals.

Unstated, state custodial building, Buckley, Wash.; bids to Olympia, Wash., July 31.

Unstated, 3-story addition to Columbia Breweries, Tacoma, Wash.; bids in July 14.

PLATES . . .

PLATES PLACED

Unstated, portion of 10,000 tons involved in Ferndale, Wash., refinery for General Petroleum Co.; to Consolidated Western Steel Corp., and Chicago Bridge & Iron Co., Seattle; Bechtel & Co., San Francisco, general contractor.

PLATES PENDING

750 tons, six fuel tanks, Elelson Field, Alaska, bid opening by U. S. Engineer, postponed to July 21.

300 tons, 800,000-gallon standpipe, Bordentown, N. J.; bids Aug. 4, city commissioners.

100 tons, 100,000-gal. water tank, Long Beach, Wash.; American Pipe & Construction Co., Portland, Oreg., low $27,325.

Unstated, six bulk storage fuel tanks, Anchorage, Alaska; bids to U. S. Engineer, Aug. 12.

RAILS, CARS . . .

RAILROAD CARS PLACED

Canadian Pacific, 155 stainless coaches, to Budd Co., Philadelphia.

Kansas City Southern, 200 fifty-ton flat cars, to the St. Louis, Mo., plant of American Car & Foundry Co., New York.

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STANDARD GAUGE FREIGHT CARS

Box, Steel Sheathed, 40-Ton Capacity
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Gondolas, Composite, or All Steel 50-Ton and 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Ore Hoppers, All-Steel, 50-Ton, Heavy Duty
Tank, 3,000-Gallon, High Pressure
Tank, 8,000-Gallon, Coiled and Non-Coiled

Hoppers, All Steel, 70-ton, Triple Hopper Cross Dump

EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'
70-Ton Capacity, Length 60'0", All-Steel, Fishbelly Underframes

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End Dump, 20-Yd., 50-Ton, Drop Door
Side Dump, 30-YD., 50-TON, DROP DOOR

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ELECTRIC MELTING FURNACE

250# to 3 ton heat capacities.

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WANTED—MANUFACTURERS REPRESENTATIVE or sales firm to represent steel fabricator specializing in steel plate and alloy fabrication. Please give full particulars. Write Box 769, STEEL, Penton Bldg, Cleveland 13, Ohio.

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EXPERIENCED SCRAP BUYER OR TRADER to travel Midwest territory. State experience, qualifications and references. Alter Company, 1701 Rockingham Road, Davenport, Iowa.

EXPERIENCED SCRAP YARD SUPERINTENDENT. Must be thoroughly capable of supervising scrap processing, scrap baler and maintenance departments. Advise experience, qualifications and references by mail. Alter Company, 1701 Rockingham Road, Davenport, Iowa.

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PLANT MANAGER with 25 years' experience in Costs, Production and Management functions, M.I.T. graduate. Write Box 758, STEEL, Penton Bldg., Cleveland 13, Ohio.

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ADMINISTRATION—SALES
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These positions require extensive experience in steel. Applicants must be capable of assuming supervisory and management responsibilities. Salary is open and will be commensurate with ability.

Include a complete resume of qualifications with reply.

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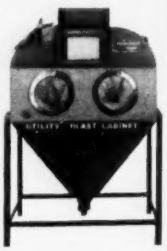

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Pangborn Hydro-Finish Cabinets—Remove directional grinding lines, hold tolerances to .0001". Reduce further finishing of tools, molds, dies . . . **$1410** and up.

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Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment.

Pangborn

BLAST CLEANS CHEAPER

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Five basic types of gear-motors are also available with Fluid Drives.

Master Fluid-Drive units make use of a fluid coupling so designed that it can be interposed easily between the motor shaft and the output shaft (or motor shaft and first stage of gears of a gear-motor). Use Master Fluid-Drive Motors and gain these advantages.

SMOOTH ACCELERATION. With the fluid drive, the load is gradually accelerated . . . no sudden jerk at starting.

FULL POWER. Since there is no load on the motor when it starts, it very rapidly attains full running speed and the duration of the starting current inrush is greatly reduced.

CUSHION EFFECT. Provides cushioned starting . . . protects motors, gears, and driven equipment from damage from severe shock loads.

WIDE APPLICATION. Fluid-Drive Motors are ideal for high inertia applications where it takes a long time to bring the load up to speed . . . for starting crane travel drives without jerking and swinging the load . . . for conveyor drives especially where they are handling fragile material . . . for agitators, textile machinery, presses, extruders, winding machinery, food machinery, laundry machinery, ball mills, calenders, machines, etc.

cushioned power

SIZES. Master Fluid-Drive Motors are available in sizes approximately ½ to 15 horsepower.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

MASTER

FLUID DRIVE MOTORS

Roll necks get electronic shave — and a close one — *with help of TIMKEN® bearings*

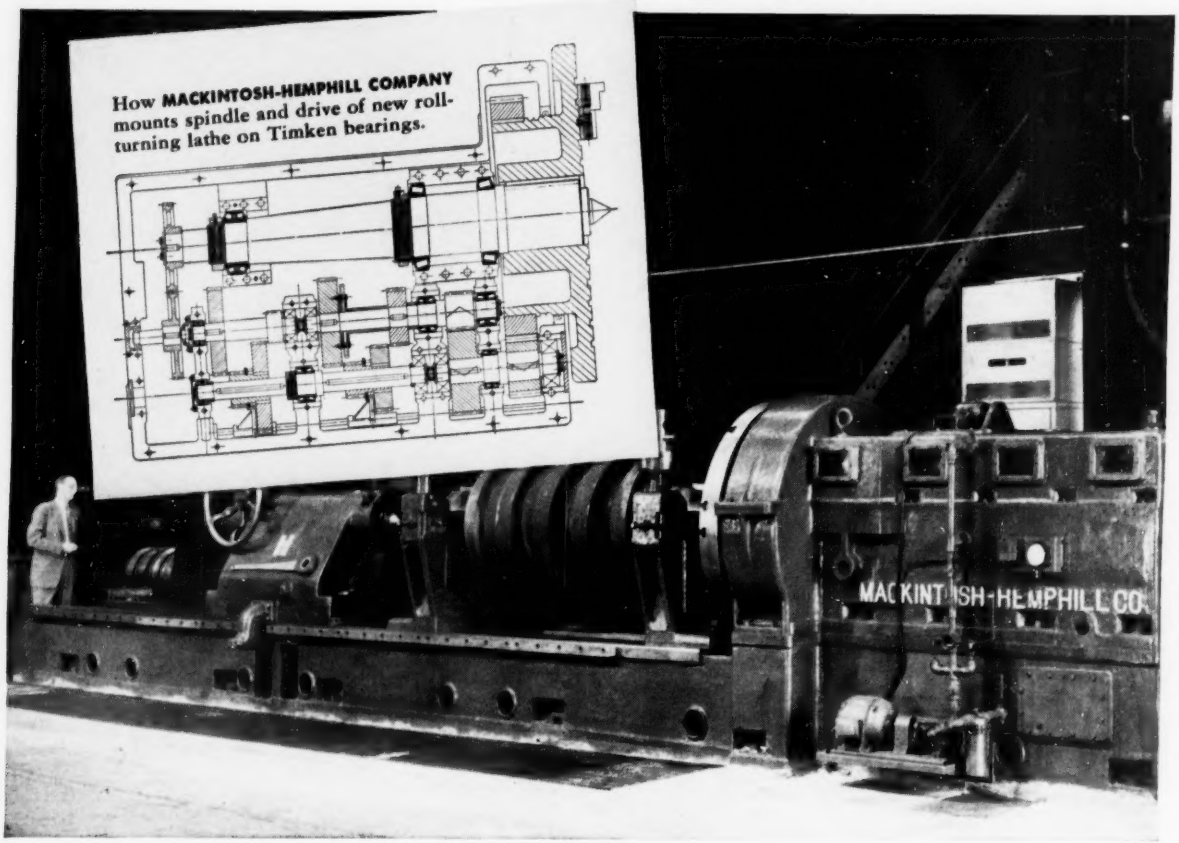
THIS giant Mackintosh-Hemphill roll-turning lathe at a large eastern steel mill is expected to save as much as 75% in actual roughing and finishing time. All-electronic controls guide the cutting tool in automatically reproducing the complex roll neck and roll body outlines.

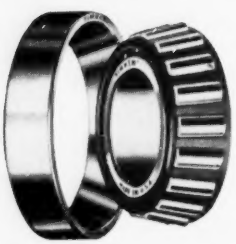
While the necks are being contoured, the roll turns on live centers. The drive end center in the main spindle is mounted on two oversize Timken® bearings at the work end, a smaller two-row Timken bearing at the other end. With line contact between rollers and races, these bearings handle 35-ton rolls with ease. The tapered roller design eliminates both end and side play, and runout on these Timken bearings never exceeds .0003".

The importance of this last is seen from the fact that, while the body is being turned, the roll is supported on its necks. Hence, the accuracy of the Timken bearings used in contouring the necks is reflected in the accuracy of the entire roll!

For technical information and assistance on bearings for steel mill equipment, consult the Timken Company engineering department. Always look for the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.


How MACKINTOSH-HEMPHILL COMPANY mounts spindle and drive of new roll-turning lathe on Timken bearings.
MACKINTOSH-HEMPHILL CO.



TIMKEN

TAPERED ROLLER BEARINGS

HOW YOU BENEFIT FROM A BEARING YOU PROBABLY DON'T USE!

The new Timken "00" bearing—with maximum runout tolerance of a mere 75 millionths of an inch—is used only for applications requiring extreme accuracy. But it helps users of standard Timken bearings, too. That's because many techniques developed to give the "00" its super accuracy are being used to raise the precision of *all* Timken bearings!